SEP 21 1998

Mr. Thaddeus A. Ryba, Project Manager
Department of the Army
Program Manager, Chemical Demilitarization

Mr. James F. Colburn
EG&G Defense Materials
Aberdeen Proving Ground, MD 21010-5401

Dear Messrs. Ryba and Colburn:

The National Program Chemicals Division (NPCD) of the U.S. Environmental Protection Agency (EPA) grants the U.S. Army Program Manager for Chemical Demilitarization, Aberdeen Proving Ground, Maryland (PMCD) approval to perform TSCA PCB Disposal Demonstration Test Burn II (RCRA/TSCA Trial Burn 1998) at the Tooele Chemical Agent Disposal Facility (TOCDF) located at the South Area of the Deseret Chemical Depot, Tooele, Utah. The demonstration tests shall be performed on the Deactivation Furnace System (DFS) of the TOCDF. This approval responds to the request dated August 21, 1998 to resume GB M55 Rocket disposal using the DFS in preparation for the Demonstration Test Burn II for disposal of PCBs in the M441 Rocket Shipping/Firing Tubes. Shakedown operations are scheduled to begin no earlier than September 24, 1998. Additionally, this approval authorizes interim operations (continued or post-trial-burn operations) after completion of the PCB Disposal Demonstration Test Burn II. Interim operations will be authorized in a stepwise manner. Specifically, if a set of conditions is met, then another increment of operations will be authorized. When the next set of conditions is met, then another increment of operations will be authorized, and so on. Performance of interim operations is subject to conditions and provisions in Condition 9 of this approval.

NPCD has reviewed the Demonstration Test Plan and the Operating Permit Applications dated July 1993 and subsequent submissions, and has determined that the information contained in the documents is acceptable for initiation of PCB Disposal Demonstration Test Burn II and that the tests will pose no unreasonable risk of injury to health and the environment.

Enclosed is a document entitled "Approval to Dispose of Polychlorinated Biphenyls (PCBs) in the Deactivation Furnace of the Chemical Agent Disposal System," for the Toxic Substances Control Act (TSCA) Demonstration Test Burn (Enclosure). For purposes of performing shakedown operations and the demonstration test burn, NPCD approves the disposal

CONCURRENCES

SYMBOL	7404	7404						
SURNAME	Dodohara	Ryba						
DATE	9/14/98	9/16/98						

of eight thousand (8,000) M55 rockets. EPA believes this number of rockets to be adequate for the shakedown and Demonstration Test Burn. PMCD may request additional rockets for disposal should the need arise. Effective dates for this approval are from September 21, 1998 through December 31, 1998.

A destruction and removal efficiency (DRE) of 99.9999% is a requisite for approval of a TSCA operating permit. In the past, the Army indicated that the incineration of nerve agents, explosives and propellants may produce products of incomplete combustion (PICs) which potentially interfere with PCB analysis. The interference may hinder demonstrating attainment of the required DRE. The Army should take steps to minimize effects of interference, e.g. implementing longer sampling time or increasing sampling rate, or including extra cleaning steps in sample preparation. EPA acknowledges that the PCB content in the shipping tubes of the rockets remaining in the Tooele stockpile may be minimal and that calculation of PCB DRE may be difficult. However, PMCD must estimate the PCB content of rockets to be used during the demonstration tests using existing PCB data from the rockets stockpile.

As part of the PCB sampling and monitoring procedures, NPCD is adding the requirement to analyze for three "dioxin like" PCB congeners, which are also referred to as the co-planar congeners. NPCD requires the Army to analyze stack samples for 3,4,3',4'-tetrachlorobiphenyl; 3,4,5,3',4'-pentachlorobiphenyl and 3,4,5,3',4'5'-hexachlorobiphenyl. EPA has chosen these congeners because it believes that they are the most toxic dioxin like congeners. Quantities of these three congeners equal to or above the PQL (practical quantitation limit) must be included in the PCB totals for DRE calculations and added to the dioxin/furan toxicity equivalent quantity total. (See Approval Condition 7 for details.) Although the Army has selected not to analyze the cyclone residue for DNT, EPA believes that DNT may be a product of incomplete combustion of TNT, which is a component of the M55 Rocket. Therefore, the Army must analyze the cyclone residue for DNT.

If further assistance is needed, please contact Mr. Hiroshi Dodohara on (202)-382-3959.

Sincerely,

John W. Melone, Director
National Program Chemicals Division

Enclosure

cc: PCB Coordinators
Regions IV, V, VI, VIII, X

FOB File

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Demonstration Test Burn
Approval to Dispose of Polychlorinated Biphenyls (PCBs)
in the Deactivation Furnace System
of the Tooele Chemical Agent Disposal Facility
Deseret Chemical Depot, Tooele, Utah

COMPANY

1. Tooele Chemical Agent Disposal Facility (TOCDF)
   Deseret Chemical Depot
   Tooele, Utah

2. Army Office of the Program Manager
   for Chemical Demilitarization
   Aberdeen Proving Ground, Maryland

3. EG&G Defense Materials, Inc.
   TOCDF Office
   Tooele, Utah

APPROVAL TYPE

PCB Demonstration Test Burn

EFFECTIVE DATE

September 21, 1998 through December 31, 1998

AUTHORITY

This approval to perform a Toxic Substances Control Act Demonstration Test Burn for PCB disposal (hereafter referred to as Demonstration Test Burn) to Section 6(e)(1) of the Toxic Substances Control Act of 1976, Public Law No. 94-469, and the Federal PCB Regulations, 40 CFR Part 761.60(e), (48 Federal Register, 13185, March 30, 1983).

BACKGROUND

TSCA DISPOSAL

Section 6(e)(1)(A) of the Toxic Substances Control Act (TSCA) requires that EPA promulgate rules for the disposal of polychlorinated biphenyls (PCBs). The rules implementing section 6(e)(1)(A) were published in the Federal Register of May 31, 1979 (44 FR 31514) and recodified in the Federal Register of May 6, 1982 (47 FR 19527). Those rules require, among other things, that various types of PCBs and PCB Articles be disposed of in EPA-approved

landfills (40 CFR 761.75), incinerators (40 CFR 761.70), high efficiency boilers (40 CFR 761.60), or by alternative methods (40 CFR 761.60(e)) that demonstrate a level of performance equivalent to EPA-approved incinerators or high efficiency boilers. The May 31, 1979 Federal Register also designated Regional Administrators as the approval authority for PCB disposal facilities.

On March 30, 1983, EPA issued a procedural rule amendment to the PCB rule (48 FR 13185). This procedural rule change transferred the review and approval authority of mobile and other PCB disposal facilities that are used in more than one region to the Office of Pesticides and Toxic Substances (OPTS). The purpose of the amendment is to eliminate duplication of effort in the regional offices and to unify the Agency's approach to PCB disposal. The amendment gives the Assistant Administrator Office of Prevention, Pesticides and Toxic Substances (OPPTS), authority to issue nationwide approvals (i.e., approvals which will be effective in all ten EPA regions) to mobile and other PCB disposal facilities that are used in more than one region. The Assistant Administrator delegated this approval authority to the Director of the Office of Pollution Prevention and Toxics (OPPT). Approval authority has since been further delegated to the Director of the National Program Chemicals Division (NPCD).

The Army submitted, on July 1993, its initial application for a TSCA PCB research and development approval (R&D) permit and an application and a Demonstration Test Burn plan for a nationwide TSCA permit to dispose of PCBs in M55 Rockets at the Tooele Chemical Disposal Facility (TOCDF). The TSCA R&D and the 1997-8 Demonstration Test Burn have been completed. After review of the Demonstration Test Burn Report, the Utah Department of Environmental Quality invalidated the tests based on malfunction of the Line A rocket agent quantification system. Subsequently, TOCDF requested approval to restart the DFS operations preparatory to performance of the PCB Disposal Demonstration Test Burn II.

CONDITIONS OF APPROVAL

1. Advance Notification: A thirty-day advance notice of the Demonstration Test Burn must be provided to the Regional Administrator of EPA Region VIII and State and local officials where the TOCDF process will be operated. This notice must include the exact location, dates and description of operation of the TOCDF process along with an estimate of the duration of testing at the site.

2. Other Permits or Approvals: Prior to commencing the Demonstration Test Burn, the Army must obtain any necessary Federal, State or local permits or approvals. During the course of the Demonstration Test Burn, the Army shall comply with all conditions and requirements of such permits or approvals.

3. Feedstock Restrictions: During the Demonstration Test Burn period, the TOCDF DFS thermal treatment process may be used by the Army to deactivate no more than 8,000 PCB-contaminated rockets, each of which may contain more than 50 mg/kg PCBs.

4. Feedstock Characterization: The Army has sampled rockets from the stockpile of M55 rockets to characterize the feedstock. The average concentration of PCBs analyzed in the past from a number of rockets may be used to calculate the total PCB feed and the destruction and removal efficiency (DRE)of PCBs in the TOCDF DFS. In accordance with EPA-approved procedures that are outlined in the following documents, gas chromatography must have been used to determine the concentration of PCBs:

"Guidelines for PCB Destruction Permit Applications and Demonstration Test Plans", EPA Contract No. 68-02-3938, April 16, 1985;

"Quality Assurance and Quality Control Procedures for Demonstrating PCB Destruction in Filing for an EPA Disposal Permit", USEPA, June 28, 1983 (Draft);

"Recommended Analytical Requirements for PCB Data Generated on Site During PCB Destruction Tests", December 12, 1985 (Draft); and

"Interim Guidelines and Specifications for Preparing Quality Assurance Plans", QAMS-005-/80, Office of Research and Development, USEPA, December 29, 1980.

Authorized EPA representatives must witness this Demonstration Test Burn and obtain appropriate split samples for verification of analytical results. The Army may conduct whatever additional analyses are necessary to characterize the waste feed and facilitate more efficient incineration, i.e., chloride content, ash content and heat of combustion.

The Army may dilute existing PCBs in the waste feed or add PCBs to the waste feed in order to achieve an appropriate PCB concentration for demonstration purposes.

5. EPA Laboratory Audit: EPA may provide samples of PCBs in test matrices, such as XAD4, in order to test the adequacy of analytical methods employed by the Army or its agent. EPA will inform the Army of approximate range of PCB concentrations and the identity of the test matrix, if such samples are provided. The Army or its agent must determine the concentration of PCBs, polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) in the test materials collected during the regular Demonstration Test Burn period, and provide EPA with all chromatograms, calculations, and records regarding the analysis. EPA personnel may observe all or any portion of the analysis procedures.

6. Process Waste Characterization: All wastes generated by the TOCDF DFS including those from the Explosives Containment Room (ECR) must be characterized. Included in the list of wastes must be the following: stack emissions, cyclone particulates, Retort discharge (bottom ash), carbon filter media from the ECR, venturi scrubber water, and packed bed scrubber water (including solids from waste water concentrator/dryer). As a minimum, all TOCDF DFS wastes must be analyzed for PCBs, PCDDs, and PCDFs. PCDD and PCDF analytical results must include the values for the 2,3,7,8-tetrachlorinated dibenzo-p-dioxin and 2,3,7,8-tetrachlorinated dibenzofuran congeners; total tetrachlorinated dibenzo-p-dioxins and tetrachlorinated dibenzofurans; total pentachlorinated dibenzo-p-dioxins and pentachlorinated dibenzofurans; total hexachlorinated dibenzo-p-dioxins and hexachlorinated dibenzofurans; total

heptachlorinated dibenzo-p-dioxins and heptachlorinated dibenzofurans; and total polychlorinated dibenzodioxins and total polychlorinated dibenzofurans.

A. The cyclone particulates, Retort discharge (bottom ash), scrubber waters, in addition, be sampled for the following parameters:

- chemical agent
- lead, cadmium
- EP toxicity test for heavy metals from solid wastes generated, and for the scrubber water from the Pollution Abatement System
- total dissolved solids for the scrubber water

B. In addition, solid wastes generated in the cyclone must be characterized for the following parameters:

- TNT and DNT:
  "total TNT": 2,4,6-; 3,4,6-; 3,4,5-TNT
  "total DNT": 2,4-; 2,3-; 3,4-;2,5-;2,6-;3,5-DNT
- RDX
- nitroglycerin

C. The TOCDF workplace air filter media must be monitored for chemical agent components.

7. Stack Emissions Monitoring: Stack emissions must be monitored for the following parameters:

- O_2, oxygen, continuous
- CO, carbon monoxide, continuous
- CO_2, carbon dioxide
- NO_x, nitrogen oxides
- HCl, hydrogen chloride
- RCl, total chlorinated hydrocarbon
- Total Particulate Matter
- PCBs, Polychlorinated Biphenyls
- Tetrachlorinated Dibenzodioxins
- Tetrachlorinated Dibenzofurans
- 2,3,7,8-Tetrachlorinated Dibenzodioxins
- 2,3,7,8-Tetrachlorinated Dibenzofurans
- total pentachlorinated dibenzodioxins
- total pentachlorinated dibenzofurans
- total hexachlorinated dibenzodioxins

- total hexachlorinated dibenzofurans
- total heptachlorinated dibenzodioxins
- total heptachlorinated dibenzofurans
- total polychlorinated dibenzodioxins
- total polychlorinated dibenzofurans

The PCB analysis must include the three toxic and most abundant congeners of the "dioxin-look-alikes" listed below, along with their respective 2,3,7,8-Tetrachlorodibenzo-p-dioxin Toxic Equivalent Factors (TEF):

PCB Congener No.	PCB Congener Chemical Designation	TEF
77	3,4,3',4'-Tetrachlorobiphenyl	0.0005
126	3,4,5,3',4'-Pentachlorobiphenyl	0.10
169	3,4,5,3',4'5'-Hexachlorobiphenyl	0.01

Quantities of the three congeners greater than or equal to the PQL (practical quantitation limit) must be included in the total amount of PCBs used in calculating DRE. Quantities of the three congeners equal to or above the PQL must be included in the 2,3,7,8-tetrachlorodibenzo-p-dioxin TEQ (toxicity equivalent quantity). Congeners found not to be greater than or equal to the PQL will be considered zero.

8. Successful Trial Runs: To satisfy the provisions of paragraphs 5 and 6, a minimum of three successful trial runs must be completed. A successful trial run is defined as one in which operations were continuous for a minimum of four hours without significant interruptions (i.e. the test has been completed on the same day initiated and the samples have been preserved and maintained intact), and one in which sampling of the stack was representative and adequate to achieve evaluation of PCB DRE to the 99.9999% level.

To calculate PCB DRE, the Army must add all PCB values quantified as well as all values detected but not quantifiable. Those values detected but not practicably quantifiable must be estimated. The maximum level estimated value shall be used. Sampling blank values shall not be subtracted from emission values to quantify emission rates.

9. Interim Operations: Disposal operations after the RCRA Trial Burn will continue, contingent upon successful completion of procedures outlined in Item 9.a below. Interim Operations are operations after the completion of the Demonstration Test Burn but before a Final Trial Burn Report is reviewed and accepted, or before the TSCA PCB Disposal Approval is issued.

a. Approval Conditions

(1) TOCDF has completed and submitted the Final Report of the 1997-98 RCRA/TSCA Trial Burn, all PCB analytical data needed to calculate the DRE were submitted to EPA.

(2) The PCB analytical data from the 1997-98 RCRA/TSCA Trial Burn demonstrated a minimum DRE of 99.9999% for Run 1 and PCB emission rates less than the health risk assessment emission value for Runs 2, 3 and 4.

(3) An operationally successful PCB Disposal Demonstration Test Burn II (RCRA/TSCA Trial Burn 1998) shall be completed. The operationally successful Demonstration Test Burn II must include a minimum of three, four-hour (minimum) runs of continuous feed of M55 rockets. There shall be no more than a total of two hours when the rocket feed is shut off.

(4) The following data from Demonstration Test Burn II shall be submitted to EPA.

A. all PCB analytical data needed to calculate the DRE;

B. all coplanar PCB data, polychlorinated dibenzofuran data and ll polychlorinated dibenzo-p-dioxin data needed to calculate total 2,3,7,8-tetrachlorodibenzo-p-dioxin equivalents (TEQ); and

C. each test in the Demonstration Test Burn II shall demonstrate a minimum PCB DRE of 99.9999% and a maximum TEQ of 0.2 nanograms per dry standard cubic meter of emissions, adjusted to 7% excess oxygen.

D. No more than fifteen calendar weeks following the completion of the PCB Disposal Demonstration Test Burn II, the complete RCRA/TSCA Trial Burn Report shall be received by EPA.

b. This phased interim operations shall not begin if the PCB Disposal Test Burn II completion requirement [condition (3)] has not been met. If Conditions (1)-(3) are met, interim operations may begin and continue for five calendar weeks. If the requirements in condition (4) are not met, interim operations shall cease. If the requirements in condition (4) are met, interim operations may continue for another ten weeks. If the requirements in condition (4D) are not met, interim operations shall cease. If the requirements in condition (4D) are met, operations may continue until the M55 rocket stockpile is completely destroyed or until EPA issues a cease order based on review of the PCB Disposal Test Burn II.

10. Process Waste Handling and Disposal: The Army, as standard operational procedure, shall dispose of all solid waste generated during the Demonstration Test Burn from the TOCDF DFS in EPA-approved chemical waste landfills, pursuant to 40 CFR 761.75 unless verified by EPA to contain PCBs at less than 2 ppm; and water discharges shall be incinerated in EPA-approved PCB incinerators unless it can be shown that the discharge contains no detectable PCBs (for this

purpose, 3 ppb) or that the discharge is controlled under an existing National Pollutant Discharge Elimination System (NPDES) permit.

11. Process Waste Disposal: All wastes generated by the TOCDF DFS process (filter media, sludge, solvent or other effluent, etc.), which have been found to contain 2 ppm or more PCBs, as calculated by comparison to an external standard homolog peak having the nearest retention time to each appropriate PCB peak to be quantified, must be disposed of in a PCB disposal facility approved by EPA under 40 CFR Part 761.60. Analytical methods specified in the application for PCBs in different phases (water, solids and oil) must be used by the Army in making such determinations.

12. Process Restrictions: The TOCDF DFS shall operate at the following conditions whenever PCBs are being incinerated:

A. The residence time for the afterburner combustion zone shall be a minimum two seconds, and the operating temperature shall be a minimum of 2000° F;

The dwell time of material in the Kiln Retort will be determined by the revolution of the kiln within a range from 0.5 to 2.0 rpm;

B. The stack excess oxygen shall be 3% minimum as measured in undiluted discharged combustion gas;

C. The combustion efficiency shall be a minimum of 99.9%, computed as follows:

$$\text{combustion efficiency} = \frac{C_{co_2}}{C_{co_2} + C_{co}} \text{ X } 100, \text{ where}$$

C_{co_2} = concentration of carbon dioxide by volume; and
C_{co} = concentration of carbon monoxide by volume.

The combustion efficiency shall be recorded at least every 15 minutes from analytical data supplied from the monitoring requirements specified in Condition 6;

D. The particulate emission rate shall be less than 0.08 grains/dscf and the HCl emissions shall be no greater than 4 lb/hr or if greater than 4 lb/hr, the removal rate shall be greater than 99%;

E. The rate and quantity of PCBs fed shall be measured and recorded at least every 15 minutes;

F. The Kiln Retort and Afterburner combustion zones outlet temperature shall be continuously measured and recorded;

G. Unless a contingency plan is submitted by the incinerator owner or operator and approved by the Director of the National Program Chemicals Division, and the contingency plan indicates what alternative measures the incinerator owner or operator will take if the flow of PCB feed material to the TOCDF DFS shall stop automatically, the flow of PCB feed material shall stop automatically when any one or more of the following conditions occur:

(i) Failure of the monitoring operations specified in Condition (7).

(ii) Failure of the PCB rate and quantity measuring and recording equipment estimated in Condition (3);

(iii) Excess oxygen falls below 3% by volume;

(iv) Failure to achieve a minimum 99.9% combustion efficiency; and

(v) The incinerator outlet temperature drops below the temperature specified in Condition 11(A).

13. Process Monitoring: Provisions must be made to assure that the following process elements are suitably monitored and recorded for each batch of PCB-contaminated M55 firing tubes processed:

A. Quantity and M55 rockets charged into the Deactivation Furnace System;

B. Quantity and PCB concentration in process waste generated (i.e., sludge, filter media, water, spent solvent or other effluent), including vent gases or other emissions;

C. Temperature and pressure of reaction in at least one-half hour intervals;

D. Date, time and duration of run; and

E. Name of operator and supervisor.

14. Process Failure: If the quality control testing as described in the Demonstration Test Burn plan and the EPA guidelines reveals that the PCBs are not being adequately destroyed, disposal activities may be ordered by EPA representatives to cease until adequate explanation is given and corrective measures are taken. A written report detailing the problem and solution shall be filed with the EPA within five business days.

15. Expiration Dates: This approval shall expire on December 31, 1998.

16. Recordkeeping: The Army TOCDF shall collect and maintain for a period of five years from the date of the Demonstration Test Burn, the following information:

A. Continuous and short interval data described below:

(i) Rate and quantity of PCBs fed into the combustion system;

(ii) Temperature of the combustion operations; and

(iii) Stack emissions, including oxygen, carbon monoxide and carbon dioxide.

B. Data and records on the monitoring of stack emissions and combustion efficiency as required by these conditions;

C. The total weight in kilograms of any solid residues generated by the incineration of PCBs during the demonstration, and the total weight in kilograms of any solid residues disposed of by the facility and the location of the solids disposed;

D. The type and amount of PCB waste and other raw materials incinerated;

E. The location, manufacturer (if known), and serial number (if any) of any equipment from which PCBs were processed;

F. A copy of each gas chromatogram from the test required by Conditions 4 and 6;

G. The date(s), time and duration of the Demonstration Test Burn;

H. The name, address and telephone number of the operator and supervisor.

The documents must be compiled within 60 days following completion of the Demonstration Test Burn, must be kept at one centralized location, and must be available for inspection by authorized representatives of the EPA upon request. The Army TOCDF or its authorized agents must also maintain the records required by 40 CFR 761.180. If the Army TOCDF or its agents terminate business, these records or their copies must be submitted to the Director of the National Program Chemicals Division.

17. Safety and Health Standards: The Army TOCDF or its agents must take all necessary precautionary measures to ensure that operation of the TOCDF DFS unit is in compliance with the applicable safety and health standards, as required by Federal, State and local regulations and ordinances.

18. Facility Security: The TOCDF DFS unit shall be secured (e.g., fence, alarm system, etc.) at the test site to restrict public access to the area.

19. PCB Releases and Spills: Any spills of PCBs or other fluids shall be promptly contained and cleaned up. In addition, a written report describing the spill, operations involved, and cleanup actions must be submitted to EPA Region VIII within five (5) business days.

A written report describing the incident must be submitted by the close of business on the next regular business day. No PCBs may be processed in that facility until the release problem has been corrected to the satisfaction of EPA Region VIII.

20. Personnel Training: The Army is responsible for ensuring that personnel directly involved with the handling or disposal of PCB-contaminated material using the TOCDF DFS process are demonstrably familiar with the general requirements of this Demonstration Test Burn approval. At a minimum this must include:

A. The type of material which may be treated during the testing of the TOCDF DFS unit, and the upper limit of the PCB contamination which may be treated;

B. Basic reporting and recordkeeping requirements under this Demonstration Test Burn approval and the location of records at the test site;

C. Notification requirements; and

D. Waste disposal requirements for process and by-product wastes generated during the testing of the TOCDF DFS process.

In this regard, the Army must maintain the following documents on-site during the testing of its incinerator; (1) copy of this Demonstration Test Burn approval, (2) spill prevention and cleanup plan, and (3) the sampling plans to collect untreated and treated materials.

21. PCB Regulation Compliance: The Army shall comply with all applicable requirements of the Federal PCB Regulations, 40 CFR Part 761, in the operation of the TOCDF DFS unit. Particular notice should be given to:

A. 40 CFR, Section 761.65 - storage for disposal;
B. 40 CFR, Section 761.79 - decontamination; and
C. 40 CFR, Section 761.180 - records and monitoring.

22. Process Modifications: Any departure from the conditions of this Demonstration Test Burn approval or the terms expressed in the application and Demonstration Test Burn plan from the Army must receive authorization from the EPA. Verbal authorizations by EPA must be followed within ten working days by a written notification from the Army describing all modifications. In this context, "application and Demonstration Test Burn plan" shall be defined as all data and materials which have been received by this Agency from the U.S. Department of the Army regarding the TOCDF DFS destruction method.

23. Approval Modifications: EPA reserves the right to impose additional conditions when it has reason to believe that the continued operation of the TOCDF DFS decontamination/disposal process presents an unreasonable risk of injury to public health or the environment, or for any other valid cause.

24. Demonstration Test Burn Approval: Under the above conditions, and given the circumstances under which the Demonstration Test Burn will be conducted, the National Program Chemicals Division finds, pursuant to 40 CFR 761.70, that these tests will not present an unreasonable risk of injury to health or the environment.

Approval to perform the Demonstration Test Burn for PCB disposal is hereby granted to the Department of the Army, Tooele Chemical Agent Disposal Facility, Deseret Chemical Depot, Tooele, Utah; the Army Office of the Program Manager for Chemical Demilitarization, Aberdeen Proving Ground, Maryland and EG&G Defense Materials, Inc., TOCDF Office, Tooele, Utah subject to the conditions expressed herein, and consistent with the materials and data included in Army application "Preliminary Demonstration Test Plan, Permit Application, PCB Destruction Unit Incinerator for the Department of the Army, Tooele Army Depot, Chemical Agent Disposal Facility" July 1993., and subsequent submissions. This Demonstration Test Burn approval is valid when conducted at the Deactivation Furnace System in the TOCDF facility on the Deseret Chemical Depot, Tooele, Utah.

Date: _____

_____

John W. Melone, Director
National Program Chemicals Division

FINDINGS

1. CHEMICAL AGENT DISPOSAL MANDATE: Under Congressional mandate, the Department of the Army must dispose of existing stocks of chemical warfare agent munitions. The Army intends to operate eight facilities throughout the country to dispose of chemical agents. PCBs have been found at concentrations regulated for disposal under TSCA within the M55 Agent Rocket shipping and firing tube assembly. Destruction of M55 Rocket components is performed in the Deactivation Furnace System (DFS). The DFS is one component of the demilitarization facility at the Tooele Chemical Agent Disposal Facility (TOCDF), for chemical munitions, storage containers, and the detoxification of nerve agents (GB and VX) and mustard agent (H and HD). TOCDF includes the DFS, the Dunnage Incinerator, the Liquid Incinerator (LIC) and the Metals Parts Furnace. The Army disposes of the M55 Rockets only in the DFS.

Congress enacted Public Law 100-456, September 29, 1988, National Defense Authorization Act, FY 1989, establishing the deadline of December 31, 1990 to complete the operations verification tests (OVT) at the Army Chemical Agent Disposal Systems in Johnston Atoll. In 1993, the Army completed the OVT at the Johnston Atoll Chemical Agent Disposal Systems (JACADS). The completion of the OVT at Johnston Atoll was pivotal because, by Congressional Order, no chemical agent disposal activity may be conducted at any Army facility excepting Tooele, Utah, until the completion of the prove out effort at Johnston Atoll. The deadline for eliminating the chemical agent stockpile is December 31, 2004.

2. In 1979, the U.S. Department of the Army initiated operations to destroy M55 rockets in the Deactivation Furnace System (DFS) of the Chemical Agent Munitions Disposal System (CAMDS) located in the Deseret Chemical Depot, Tooele, Utah. In the fall of 1985, PCBs were identified in the firing and shipping (F/S) tubes which encase the M55 rockets.

The M55 Rocket F/S tubes consists of either chopped or matted fiberglass, depending on manufacturer, and weigh approximately 14 pounds each. The two types of tubes are readily discernable visually. Analytical results from a sample of 55 tubes revealed that the chopped variety consistently contained PCBs below 50 mg/kg (50 ppm). The matted type showed some results below 50 mg/kg PCBs; however, the majority of matted tubes contained PCBs above 2000 mg/kg with a high concentration of 4290 mg/kg. One matted tube had been painted, contained a level of 15,200 mg/kg PCBs and was considered a statistical outlier and therefore not used by the Army in the calculation of PCB content.

Additional samples of the F/S tubes revealed that 3% of the 147 chopped tubes sampled contained PCB concentrations of over 50 ppm. The 1000 matted S/F tubes sampled exhibited a bimodal distribution with 47% of the matted tubes containing less than 50 ppm PCBs and 53% of the tubes containing PCBs concentrations of over 2700 ppm. The highest concentration of PCBs in the matted S/F tubes was found to be 5800 ppm. In 1987, the Army submitted results from a sampling program which characterized the PCB contamination of the universe of M55 shipping/firing (s/f) tubes. The s/f tubes generally possessed PCB levels in the 2000 to 4000 ppm region, averaging 2700 ppm. Analysis of samples collected recently indicate that the rocket

tubes to be treated during R&D operations exhibit average levels of PCBs of about 1,247 ppm.

3. The Deactivation Furnace System contains the Explosive Containment Room (ECR), the Retort, and the Pollution Abatement System (PAS). Operators transport the rockets from storage, unpack and load them onto a conveyor leading to the ECR. Instruments control operations in the ECR automatically. A punch unit pierces the rocket warheads draining and removing 95% of the chemical agent. Conveyors carry the rocket to a shearing apparatus, cutting the rocket into eight segments. The rocket pieces fall into the Retort through a sliding gate and then through a tipping valve. The sliding gate acts as a barrier to contain any deflagration or explosion. The rocket segments travel through the Retort countercurrent or opposite to flow of hot gases and exit through a heated discharge conveyor.

4. Combustion gases pass through a blast attenuation duct and flow into the Cyclone separating large particulates from the gas stream. The gases continue through a slagging afterburner and a quencher, and is then cleansed, using a venturi scrubber and a packed bed scrubber. Finally, the gases pass through a mist eliminator and discharges through the common stack.

5. The Retort is a rotary kiln with the burner located at the exit (rocket segment exit), rated at eight million BTU/hr. Fugitive emissions are controlled by operating the furnace under negative pressure. The kiln rotates at 0.5 to 2 rpm. The kiln retention time for solids is about 12 minutes, however, varies with the rpm. The solids are heated for an additional 15 minutes in the heated discharge conveyor. The Retort and conveyor operate at a minimum temperature of 1000°F. Dimensions of the Retort are nominally 5-feet in diameter and 32 feet 10-1/2 inches long.

6. A sealed drum below the cyclone collects particulates, primarily fiberglass which flow past a gate discharge valve mechanism. The collected material is periodically analyzed for chemical agents.

7. The afterburner, with a retention time of two seconds minimum, operates at **2150**°F. The quench tower reduces exhaust gases to less than 300°F while the venturi scrubber removes particulates. A single closed loop brine system serves both the quench tower and the venturi scrubber. A packed tower removes acidic gases while a controller unit in the closed loop system maintains brine pH at a level of about 8.

8. Details of the Deactivated Furnace System and the agent rockets have been filed with EPA Headquarters in Washington, D.C. in the application and Demonstration Test Burn plan for permit approval dated July 1993.

9. RCRA/TSCA Trial Burn, 1997-98: The PCB Demonstration Test Burn performed as part of the RCRA/TSCA Chemical Agent GB Trial Burn was completed in January 1998. The results of the Trial Burn are summarized in the following tables.

SUMMARY OF TEST CONDITION AND RESULTS

Process	Test Runs	Require-

Parameters	Units	No. 1	No. 2	No. 3	No.4	Avg.	ments
Feed Rate Set Point	no./hr	38	38	38	38	38	
Rocket Feed Rate	no./hr	34.3	36.5	35.8	36.2	35.2	
DFS Temperatures	°F						
Retort Burner End (HDC Top)		1093	1095	1098	1096	1095.5	> 1000
Afterburner Exhaust		2151	2150	2150	2149	2150	
2200±150							
Combustion Efficiency	%	99.99	99.99	99.99	99.99	99.99	≥99.9
PCBs DRE	%	99.999973	99.999668	99.999596	99.999795	99.999788	>99.9999
PCBs DRE Adjusted*	%	99.999974	99.999985	99.999949	99.999851	99.999930	>99.9999
Particulate, to 7% O_2	mg/dscm	10.1	na	3.9	11.4	8.5	<180
HCl Emission	lb/hr	<0.04	na	<0.04	<0.04	<0.04	<4
Stack Dry Gas Flow	dscf/hr	660,000	630000	610,000	610,000	630,000	
Oxygen	%	9.0	na	9.5	9.6	9.4	

Process Parameters (cont'd)	Units	Test Runs No. 1	No. 2	No. 3	No.4	Avg.	Require-ments
Oxygen (PDAR)	%	9.8	9.8	9.7	9.7	9.8	
Carbon dioxide	%	6.5	na	7.0	7.1	6.9	
Carbon dioxide (PDAR)	%	6.4	6.8	6.7	6.7	6.7	
Carbon Monoxide, to 7% O2	ppm	8	8	7	7	7.5	<100
Carbon Monoxide, (PDAR)	ppm	6.4	6.8	6.7	6.7	6.7	<100
PCB Stack Concentration	µg/dscm	<0.0037	<0.0455	<0.0638	<0.0338	<0.0438	
PCB Stack Conc.- Adjusted	µg/dscm	<0.0037	<0.0021	<0.0035	<0.0269	<0.0114	
PCB Emission Rate	gm/hr	$<6.83\times10^{-5}$	$<4.79\times10^{-3}$	$<1.13\times10^{-3}$	$<5.71\times10^{-4}$	$<1.64\times10^{-3}$	
PCB Emission Rate Adjusted	gm/hr	$<6.83\times10^{-5}$	2.21×10^{-4}	$<6.36\times10^{-5}$	$<4.4\times10^{-4}$	$<1.98\times10^{-4}$	

DIOXIN/FURAN EMISSION

PCDD/PCDF, ng/dscm	Run 1	Run 3	Run 4
PCDDs			
2,3,7,8-TCDD	<8.49E-04	<7.16E-04	<5.39E-04
Total TCDD	2.86E-03	<1.17E-03	2.46E-03
1,2,3,7,8-PeCDD	<2.26E-03	<3.02E-03	<2.46E-03
Total PeCDD	<2.57E-03	<3.02E-03	<2.95E-03
1,2,3,4,7,8-HxCDD	<4.57E-04	<1.08E-03	<7.19E-04
1,2,3,6,7,8-HxCDD	<4.44E-04	<6.28E-04	<6.83E-04
1,2,3,7,8,9-HxCDD	<4.57E-04	<6.63E-04	<7.19E-04
Total HxCDD	<8.88E-04	<6.63E-04	<7.19E-04
1,2,3,4,6,7,8-HpCDD	<1.58E-03	<1.40E-03	<2.99E-03
Total HpCDD	<1.58E-03	<1.40E-03	<2.99E-03
OCDD	<11.4E-03	<3.79E-04	<14.0E-03
Total PCDDs	<19.3E-03	<11.6E-03	<23.2E-03
Sub-Total TEQ 2,3,7,8-TCDD	<2.14E-03	<1.47E-03	<9.18E-04
PCDFs			
2,3,7,8-TCDF	4.15E-03	5.35E-03	5.07E-03
Total TCDF	9.64E-03	9.53E-03	11.2E-03
1,2,3,7,8-PeCDF	<1.36E-03	<1.87E-03	<1.64E-03

2,3,4,7,8-PeCDF	<1.24E-03	<1.70E-03	<1.19E-03
Total PeCDF	<2.64E-03	<1.87E-03	<2.91E-03
1,2,3,4,7,8-HxCDF	<9.01E-04	<5.08E-04	<8.27E-04
1,2,3,6,7,8-HxCDF	<6.01E-04	<6.63E-04	<4.86E-04
2,3,4,6,7,8-HxCDF	<8.09E-04	<7.15E-04	<5.22E-04
1,2,3,7,8,9-HxCDF	<1.02E-03	<8.56E-04	<6.29E-04
Total HxCDF	<1.07E-03	<8.56E-04	<9.17E-04
1,2,3,4,6,7,8-HpCDF	<6.53E-04	<7.33E-04	<1.01E-03
1,2,3,4,6,7,8-HpCDF	<5.48E-04	<4.71E-04	<1.21E-03
Total HpCDF	<8.22E-04	<7.67E-04	<1.21E-03
OCDF	<1.64E-03	<1.78E-03	<1.71E-03

DIOXIN/FURAN EMISSION (cont'd)

PCDD/PCDF, ng/dscm	Run 1	Run 3	Run 4
PCDFs			
Total PCDFs	<15.8E-03	<1.77E-03	<17.9E-03
Sub-Total TEQ 2,3,7,8-TCDF	<1.47E-03	<3.24E-03	<1.47E-03
(TOCDF"s value)	<4.15E-04	<5.34E-04	<5.07E-04
Total TEQ 2,3,7,8-TCDF	**<3.61E-03**	**< 4.71E-03**	**< 2.39E-03**

DIOXIN/FURAN EMISSION RATES, gm/sec

PCDDs	Run 1	Run 3	Run 4	HRA Emission Rate
2,3,7,8-TCDD	<4.37E-12	<3.51E-12	<2.54E-12	
Total TCDD	1.47E-11	<5.73E-12	1.16E-11	5.27E-11
1,2,3,7,8-PeCDD	<1.16E-11	<1.48E-11	<1.16E-11	
Total PeCDD	<1.32E-11	<1.48E-11	<1.39E-11	<2.63E-10
1,2,3,4,7,8-HxCDD	<2.35E-12	<5.29E-12	<3.39E-12	
1,2,3,6,7,8-HxCDD	<2.29E-12	<3.08E-12	<3.22E-12	
1,2,3,7,8,9-HxCDD	<2.35E-12	<3.25E-12	<3.39E-12	
Total HxCDD	<4.57E-12	<3.25E-12	<3.39E-12	<7.19E-10
1,2,3,4,6,7,8-HpCDD	<8.14E-12	<6.86E-12	<1.41E-11	
Total HpCDD	<8.14E-12	<6.86E-12	<1.41E-11	<5.63E-10
OCDD	<5.87E-11	<1.86E-12	<6.60E-11	<1.20E-09
Total PCDDs	<9.94E-11	<5.68E-11	<1.09E-10	
Sub-Total TEQ 2,3,7,8-TCDD	<1.10E-11	<7.20E-12	<4.33E-12	
PCDFs				
2,3,7,8-TCDF	2.14E-11	2.62E-11	2.39E-11	
Total TCDF	4.96E-11	4.67E-11	5.28E-11	5.27E-11
1,2,3,7,8-PeCDF	<7.00E-12	<9.16E-12	<7.73E-12	
2,3,4,7,8-PeCDF	<6.39E-12	<8.33E-12	<5.61E-12	
Total PeCDF	<1.36E-11	<9.16E-12	<1.37E-11	<5.39E-10
1,2,3,4,7,8-HxCDF	<4.63E-12	<2.49E-12	<3.90E-12	
1,2,3,6,7,8-HxCDF	<3.10E-12	<3.25E-12	<2.29E-12	
2,3,4,6,7,8-HxCDF	<4.17E-12	<3.50E-12	<2.46E-12	
1,2,3,7,8,9-HxCDF	<5.25E-12	<4.19E-12	<2.97E-12	
Total HxCDF	<5.51E-12	<4.19E-12	<4.33E-12	<1.10E-09
1,2,3,4,6,7,8-HpCDF	<3.36E-12	<3.59E-12	<4.76E-12	
1,2,3,4,6,7,8-HpCDF	<2.82E-12	<2.31E-12	<5.71E-12	

Total HpCDF	<4.23E-12	<3.76E-12	<5.71E-12	<6.35E-10
OCDF	<8.45E-12	<8.72E-12	<8.07E-12	<5.27E-10
Total PCDFs	<8.14E-12	<8.67E-12	<8.44E-11	
Sub-Total TEQ 2,3,7,8-TCDF	<7.57E-12	<1.59E-11	<3.27E-11	
Total TEQ 2,3,7,8-TCDF	**<1.86E-11**	**<2.31E-11**	**<1.13E-11**	**<5.65E-09**

PRODUCTS OF INCOMPLETE COMBUSTION*

VOLATILE ORGANICS, µg/m³	Run 1	Run 3	Run 4	Applicable Standards: OSHA TWA PELS, mg/dscm	Applicable Standards: ACGIH TLV & Others, mg/dscm
Acetone	<10 ND	18	12	2400	2400
Benzene	2.3	3.0	3.3	10 ppm (1910.1028)	
	0.5 ppm (1926.1128)				
Bromodichloromethane	2.8	2.9	3.1		
Bromoethene (Vinyl Bromide)*	<10 ND	<10 ND	<10 ND		
Bromoform	3.0	3.5	3.4	5	5
Bromomethane (Methyl Bromide)	5.7	3.9	2.9		
1,3-Butadiene*	<10 ND	<10 ND	<10 ND		
2-Butanone (MEK)	<10 ND	41	10	590	590
Carbon disulfide	<10 ND	<10 ND	<10 ND	20 ppm	60
Carbon tetrachloride	<2.0 ND	<2.0 ND	<2.0ND	10 ppm	25 ppm
Chlorobenzene	2.0	<2.0 ND	<2.0 ND	350	350
Chloroethane (Ethyl Chloride)	<2.0 ND	<2.0 ND	<2.0 ND		
Chloroform	2.2	2.2	2.4	(C)240	(C)240
Chloromethane (Methyl Chloride)	4.6	6.2	3.4	25 ppm	25 ppm
Chloropropane*	<1.9	<2.0	<2.0		
Dibromochloromethane	3.8	4.3	4.8		
Dibromomethane*	<1.9 ND	<2.0 ND	<2.0 ND		
1,2-Dibromomethane (Ethylene Dibromide)*	<1.9 ND	<2.0 ND	<2.0 ND		
cis-1,4-Dichloro-2-butene*	<1.9 ND	<2.0 ND	<2.0 ND		
trans-1,4-Dichloro-2-butene*	<1.9 ND	<2.0 ND	<2.0 ND		
Dichlorodiflouromethane (Freon 12)*	<1.9 ND	<2.0 ND	<2.0 ND		
1,1-Dichloroethane	<1.9 ND	<2.0 ND	<2.0 ND	400 (100 ppm)	400
1,2-Dichloroethane (EDC)	<1.9 ND	<2.0 ND	<2.0 ND	50 ppm	200
1,1-Dichloroethene	<2.0 ND	<2.0 ND	<2.0 ND		
trans-1,2-Dichloroethene	<2.00 ND	<2.0 ND	<2.0 ND		
1,2-Dichloropropane*	<1.9 ND	<2.0 ND	<2.0 ND		
cis-1,3-Dichloropropene*	<1.9 ND	<2.0 ND	<2.0 ND		
trans-1,3-Dichloropropene*	<1.9 ND	<2.0 ND	<2.0 ND		
Ethylbenzene	2.0	<2.0 ND	<2.0 ND	435	435
Iodomethane	<2.0 ND	2.0	<2.0 ND		
N-Hexane	2.0	2.2	2.1	500 ppm,	1800 mg/m
Methylene Chloride	3.5	5.8	4.8	100 ppm	1910.1052
4-Methyl-2-pentanone (MIBK)	<10 ND	<10 ND	<10 ND		
2-Propanol*	<190 ND	<190 ND	<202 ND		
Styrene	<1.9 ND	9.2	<2.0 ND	100 ppm	(C)420
1,1,2,2-Tetrachloroethane	< 2.0 ND	<2.0 ND	<2.0 ND		35
		35			
Tetrachloroethene (PCE)	<2.0 ND	4.3	<2.0 ND		
1,1,1-Trichloroethane (TCA)	<2.0 ND	<2.0 ND	<2.0 ND	1900	1900
1,1,2-Trichloroethane	<2.0 ND	<2.0 ND	<2.0 ND	45	45
Trichlorethene (TCE)*	<2.0 ND	<2.0 ND	<2.0 ND		
Trichlorofluoromethane	<2.0 ND	<2.0 ND	<2.0 ND		
1,1,2-Trichloro-1,2,2-Trifluoro-ethane (Freon 113)	<1.9 ND	<2.0 ND	<2.0 ND		
Toluene	2.5	<2.0 ND	2.2	200 ppm	750

Vinyl Acetate	<10 ND	<10 ND	<10 ND		
Vinyl Chloride	<2.0 ND	<2.0 ND	<2.0 ND	1 ppm	1 ppm
m/p-Xylene	<2.0 ND	<2.0 ND	<2.0 ND	435	435
o-Xylene	<1.9 ND	<2.0 ND	<2.0 ND	435	435

* Data for Run 2 not available. The Semi-Volatile sampling train for Run 2 was invalidated. RCRA stack samples were not analyzed.

SEMIVOLATILE ORGANICS, µg/dscm

Acenaphthene	<0.15 ND	<0.15 ND	<0.16 ND		
Acenaphthylene	<0.15 ND	<0.15 ND	<0.16 ND		
Acetophenone*	<0.15 ND	<0.16 ND	<0.16 ND		
2-Acetoaminofluorene*	<1.5 ND	<1.50 ND	<1.57 ND		
Anthracene	<0.15 ND	<0.15 ND	<0.16 ND	[430][1]	
4-Aminobiphenyl*	<0.15 ND	<0.15 ND	<0.16 ND		
3-Amino-9-carbazole*	<0.15 ND	<0.15 ND	<0.16 ND		
Aniline*	<0.15 ND	<0.15 ND	<0.16 ND		
Aramite*	<0.15 ND	<0.15 ND	<0.16 ND		
Benzaldehyde*	<0.15 ND	<0.45	<0.20		
Benzenethiol*	<1.5 ND	<1.50 ND	<1.57 ND		
Benzidine*	<1.47 ND	<1.50 ND	<1.57 ND		
Benzo(a)anthracene	<0.15 ND	<0.15 ND	<0.16 ND		
Benzo(b)flouranthenes	<0.15 ND	<0.15 ND	<0.16 ND		
Benzo(j)flouranthenes	<0.15 ND	<0.15 ND	<0.16 ND		
Benzo(k)flouranthenes	<0.15 ND	<0.15 ND	<0.16 ND		
Benzo(g,h,i)perylene	<0.15 ND	<0.15 ND	<0.16 ND		
Benzo(a)pyrene	<0.15 ND	<0.15 ND	<0.16 ND	coal	coal
Benzo(e)pyrene*	<0.15 ND	<0.15 ND	<0.16 ND	coal	coal
Benzoic acid	<1.47 ND	<1.50 ND	<1.57 ND	[2530][10]	
Benzyl alcohol	<0.15 ND	<0.15 ND	<0.16 ND	[4354][12]	
Biphenyl*	<0.15 ND	<0.15 ND	<0.16 ND		
4-Bromophenyl phenyl ether	<0.15 ND	<0.15 ND	<0.16 ND		
Butyl benzylphthalate	<0.15 ND	<0.15 ND	<0.16 ND	[2330][2]	
2-sec-Butyl-4,6-dinitro-phenol*	<0.15 ND	<0.15 ND	<0.16 ND		
Chloroaniline*	<0.15 ND	<0.15 ND	<0.16 ND		
Chlorobenzilate*	<0.15 ND	<0.15 ND	<0.16 ND		
bis(2-Chloroethoxy)methane	<0.15 ND	<0.15 ND	<0.16 ND		
bis(2-Chloroethyl)ether	<0.15 ND	<0.15 ND	<0.16 ND		
4-Chloro-3-methylphenol	<0.15 ND	<0.15 ND	<0.16 ND		
1Chloronaphthalene	<0.15 ND	<0.15 ND	<0.16 ND		
2-Chloronaphthalene	<0.15 ND	<0.15 ND	<0.16 ND		
2-Chlorophenol	<0.15 ND	<0.15 ND	<0.16 ND		
4-Chlorophenyl phenyl ether	<0.15 ND	<0.15 ND	<0.16 ND		
Chrysene	<0.15 ND	<0.15 ND	<0.16 ND	coal	200[1]
4,4'-DDE*	<1.5 ND	<1.50 ND	<1.57 ND		
Diallate*	<0.29 ND	<0.30 ND	<0.31 ND		
Dibenz(a,h)anthracene	<0.15 ND	<0.15 ND	<0.16 ND		

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[1]LD_{50}: mg/kg oral, mouse

[12]LC_{lo}: mg/m^3 rat

[2]LD_{50}: mg/kg, oral. rat

Dibenz(a,j)acridine	<0.15 ND	<0.15 ND	<0.16 ND		
Dibenzofuran	<0.15 ND	<0.15 ND	<0.16 ND		
DBCP (1,2-Dibromo-3-Chloropropane*)	<1.5 ND	<1.50 ND	<1.57 ND		
Di-n-butyl phthalate	<0.15 ND	<0.15 ND	<0.16 ND	5	5
1,2-Dichlorobenzene	<0.15 ND	<0.15 ND	<0.16 ND	(C)300	(C)300
1,3-Dichlorobenzene	<0.15 ND	<0.15 ND	<0.16 ND		
1,4-Dichlorobenzene	<0.15 ND	<0.15 ND	<0.16 ND	450	450
3,3'-Dichlorobenzidine	<0.29 ND	<0.30 ND	<0.31 ND	§1910.1007[a]	§1926.1107[a]
2,4-Dichlorophenol*	<0.15 ND	<0.15 ND	<0.16 ND	450	450
2,6-Dichlorophenol*	<0.15 ND	<0.15 ND	<0.16 ND	450	450
Dihydrosafrole*	<1.5 ND	<1.50 ND	<1.57 ND		
Diethyl phthalate	<0.15 ND	<0.15 ND	<0.16 ND	5[3]	
p-Dimethylaminoazobenzene*	<0.15 ND	<0.15 ND	<0.16 ND		
7,12-Dimethylbenz(a)anthracene*	<0.15 ND	<0.15 ND	<0.16 ND		
3,3'-Dimethylbenzidine*	<0.15 ND	<0.15 ND	<0.16 ND		
a,a-Dimethylphenethyl-amine*	<0.15 ND	<0.15 ND	<0.16 ND		
2,4-Dimethylphenol*	<0.15 ND	<0.15 ND	<0.16 ND		
Dimethyl phthalate	<0.15 ND	0.96	<0.16 ND	5	5
1,3-Dinitrobenzene*	<0.15 ND	<0.15 ND	<0.16 ND		
4,6-Dinitro-2-methylphenol*	<0.73 ND	<0.75 ND	<0.78 ND		
1,3-Dinitrobenzene*	<0.15 ND	<0.15 ND	<0.16 ND		
2,4-Dinitrophenol*	<073 ND	<0.75 ND	<0.78 ND		
2,6-Dinitrotoluene	<0.15 ND	<0.15 ND	<0.16 ND	1.5	1.5
Dioxathion*	<0.00 ND	<0.00 ND	<0.00 ND		
Di-n-octyl phthalate	<0.15 ND	<0.15 ND	<0.16 ND	[6513][4]	
1,2-Diphenylhydrazine*	<0.15 ND	<0.15 ND	<0.16 ND		
Diphenylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
bis(2-Ethyhexyl)phthalate	<1.18 ND	<2.35	<5.44	5	5
Ethyl methanesulfonate*	<0.15 ND	<0.15 ND	<0.16 ND		
Ethyl parathion*	<1.47 ND	<1.50 ND	<1.57 ND		
Fluoranthene	<0.15 ND	<0.15 ND	<0.16 ND	[2000][5]	
Fluorene	<0.15 ND	<0.15 ND	<0.16 ND		
Hexachlorobenzene	<0.15 ND	<0.15 ND	<0.16 ND		
Hexachlorobutadiene	<0.15 ND	<0.15 ND	<0.16 ND		
Hexachlorocyclopentadiene	<0.15 ND	<0.15 ND	<0.16 ND		
Hexachloroethane	<0.15 ND	<0.15 ND	<0.16 ND		
Hexachlorophene*	<1.47 ND	<1.50 ND	<1.57 ND		
Hexachloropropene*	<0.15 ND	<0.15 ND	<0.16 ND		
Indeno(1,2,3-cd)pyrene	<0.15 ND	<0.15 ND	<0.16 ND		
Isophorone	<0.15 ND	<0.15 ND	<0.16 ND	140	140
Isosafrole*	<0.29 ND	<0.30 ND	<0.31 ND		
Methapyrilene*	<0.15 ND	<0.15 ND	<0.16 ND		
Methoxychlor*	<1.47 ND	<1.50 ND	<1.57 ND		
3-Methylcholanthrene*	<0.15 ND	<0.15 ND	<0.16 ND		
Methyl methanesulfonate*	<0.15 ND	<0.15 ND	<0.16 ND		
2-Methylnaphthalene	<0.15 ND	<0.15 ND	<0.16 ND	[4360][2]	
2-Methy-5-nitroaniline*	<1.47 ND	<1.50 ND	<1.57 ND		

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[3]TLV: mg/m^3 (Threshold Limit Value)

[4]LD_{50}: mg/kg, oral, mouse

[5]LD_{50}: mg/kg, oral, rat

2-Methyl phenol	<0.15 ND	<0.15 ND	<0.16 ND	22[6]	
3/4-Methyl phenol	<0.15 ND	<0.15 ND	<0.16 ND	22[7]	
Naphthalene	<0.15 ND	<0.15 ND	<0.16 ND	50	50
1,4-Naphthoquinone*	<0.15 ND	<0.15 ND	<0.16 ND		
1-Naphthylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
2-Naphthylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
5-Nitroacenapthene*	<1.47 ND	<1.50 ND	<1.57 ND		
2-Nitroaniline*	<0.73 ND	<0.75 ND	<0.78 ND		
3-Nitroaniline*	<0.73 ND	<0.75 ND	<0.78 ND		
4-Nitroaniline*	<0.73 ND	<0.75 ND	<0.78 ND		
Nitrobenzene	<0.15 ND	<0.15 ND	<0.16 ND	5	5
2-Nitrophenol*	<0.15 ND	<0.15 ND	<0.16 ND		
4-Nitrophenol*	<0.73 ND	<0.75 ND	<0.78 ND		
4-Nitroquinoline-1-oxide*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitroso-di-n-butylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitrosodiethylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitrosodimethylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitrosodiphenylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitroso-di-n-propylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitrosomethylethylamine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitrosomorpholine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitrosopiperidine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitrosopyrrolidine*	<0.15 ND	<0.15 ND	<0.16 ND		
N-Nitro-o-toluidine*	<0.15 ND	<0.15 ND	<0.16 ND		
Pentachlorobenzene*	<0.15 ND	<0.15 ND	<0.16 ND		
Pentachloroethane*	<0.15 ND	<0.15 ND	<0.16 ND		
Pentachloronitrobenzene (PNCB)*	<0.73 ND	<0.75 ND	<0.78 ND		
Pentachlorophenol*	<0.73 ND	<0.75 ND	<0.78 ND		
Phenacetin*	<0.15 ND	<0.15 ND	<0.16 ND		
Phenanthrene	<0.15 ND	<0.15 ND	<0.16 ND	[50][8]	
Phenol	<0.17	<0.15 ND	<0.16 ND	19	19
p-Phenylenediamine*	<0.15 ND	<0.15 ND	<0.16 ND		
2-Picoline*	<0.15 ND	<0.15 ND	<0.16 ND		
Pronamine*	<0.15 ND	<0.15 ND	<0.16 ND		
Pyrene	<0.15 ND	<0.15 ND	<0.16 ND	[170][9]	
Pyridine*	<0.29 ND	<0.30 ND	<0.31 ND	[170][10]	
Quinoline*	<1.47 ND	<1.50 ND	<1.57 ND		
Safrole*	<1.47 ND	<1.50 ND	<1.57 ND		
1,2,4,5-Tetrachlorobenzene*	<0.15 ND	<0.15 ND	<0.16 ND		
2,3,4,5-Tetrachlorophenol*	<0.73 ND	<0.75 ND	<0.78 ND		
p-Toluidine*	<0.15 ND	<0.15 ND	<0.16 ND		
2-Toluidine*	<0.15 ND	<0.15 ND	<0.16 ND		
Tributylamine*	<1.47 ND	<1.50 ND	<1.57 ND		

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[6]PEL for skin exposure

[7]PEL for skin exposure

[8]LD_{50}: mg/kg, oral, mouse

[9]LC_{50}: mg/m^3, rat

[10]LC_{50}: mg/m^3, rat

1,2,4-Trichlorobenzene	<0.15 ND	<0.15 ND	<0.16 ND	36[11]
2,4,5-Trichlorophenol*	<0.15 ND	<0.15 ND	<0.16 ND	
2,4,6-Trichlorophenol*	<0.15 ND	<0.15 ND	<0.16 ND	
0,0,0-Triethylphosphorothioate*	<1.47 ND	<1.50 ND	<1.57 ND	36[12]
1,3,5-Trinitrobenzene*	<0.15 ND	<0.15 ND	<0.16 ND	36[13]

Tentatively Identified Compounds (TICs)[a]

Cyclohexane, 1,2-dichloro-, trans-	0.02	0.04	0.03
Hexadecanoic Acid	0.18	0.31	0.36
4-Hydroxy-methy-2-pentanone	0.13	0.00	0.00
Ethylbenzene	0.00	0.03	0.03
Amyl Aceate	0.00	0.03	0.00
Tetradecanoic Acid	0.00	0.03	0.00
Pentadecanoic Acid	0.00	0.02	0.00
9-Hexadecanoic Acid	0.00	0.04	0.03
Oleic Acid	0.00	0.04	0.04
Octadecanoic Acid	0.00	0.08	0.10
Octadecanamide	0.00	0.06	0.02
1,3,5,7-Cyclooctotetraene	0.00	0.15	0.00
Heptane, 3-ethyl-5-methyl	0.00	0.06	0.00
N-Decane	0.00	0.15	0.00
Benzaldehyde, ethyl	0.00	0.07	0.05
Hexadecanoic Acid, mono (2-ethylhexyl) ester	0.00	0.06	0.06
Pentatriacontane	0.00	0.15	0.00
Pentadecanoic Acid, dimethyl ester	0.00	0.03	0.00
2-Ethyl-1-hexanol	0.00	0.00	0.06
Propanoic Acid, 2-methyl, 2,2-dimethyl-1-(2-	0.00	0.00	0.06
Propanoic Acid, 2-methyl, 3-hydroxy-2,4,4-tr	0.00	0.00	0.07
2,6 bis(1,1-Dimethylethyl)-4-methylphenol	0.00	0.00	0.04

[a]TIC=Compounds not listed in EPA Method 8270

METALS EMISSIONS, µg/dscf

	Run 1	Run 3	Run 4
Aluminum	1.4	0.6	1.3
Antimony	0.07	0.03	0.12
Arsenic	0.015	<0.61 ND	1.0
Barium	0.03	0.03	0.05
Beryllium	<0.004 ND	<0.005 ND	0.005 ND

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[11]TLV: mg/m^3 (Threshold Limit Value)

[12]TLV: mg/m^3 (Threshold Limit Value)

[13]TLV: mg/m^3 (Threshold Limit Value)

Boron	0.04	0.05	0.31
Cadminum	1.02	0.18	1.10
Chromium	0.15	0.03	0.15
Chromium, +6	0.06	0.08	0.08
Cobalt	0.008	0.021	0.01
Copper	0.07	0.05	0.10
Lead	37.0	6.4	32
Manganese	0.09	0.083	0.06
Mercury	0.056	0.059	0.057
Nickel	0.04	0.09	0.05
Phosphorous	14	1.7	8.9
Selenium	<0.009 ND	<0.009 ND	<0.009 ND
Silver	<0.002 ND	<0.002 ND	<0.002 ND
Thallium	<0.004 ND	<0.005 ND	<0.005 ND
Tin	0.04	0.02	0.02
Vanadium	<0.021 ND	<0.023 ND	<0.024 ND
Zinc	6.3	1.5	4.4

PCBs, PCDDs/PCDFs in Process Streams

PCBs

Process	Units	Test Runs No. 1	No. 3	No.4	Avg.
HDC Ash,	ng/gm	32.6	ND	7.2	13.3
Cyclone Ash,	ng/gm	10.9	ND	3.3	4.7
Scrubber Brine,	ng/L	ND	ND	ND	ND
Process Water,	ng/L	ND	ND	ND	ND
Caustic,	ng/L	ND	ND	ND	ND
Stack Condensate,	ng/l	ND	ND	ND	ND

TEQ 2,3,7,8-TCDD

Process	Units	Test Runs No. 1	No. 3	No.4	Avg.
HDC Ash,	pg/g	13.557	26.186	65.571	35.105
Cyclone Ash,	pg/g	86.222	0.33	32.261	39.604
Scrubber Brine,	ng/L	ND	ND	ND	ND
Process Water,	ng/L	ND	ND	ND	ND
Caustic,	ng/L	ND	ND	ND	ND
Stack Condensate,	ng/l	ND	ND	ND	ND

Volatile Organics Detected in Process Streams, ug/L

	Scrubber Brine			Process Water		
	Run 1	Run 3	Run 4	Run 1	Run 3	Run 4
Chloroform	ND	ND	ND	2.7	ND	ND
Bromodichloromethane	ND	ND	ND	4.8	2.3	1.9
Dibromochloromethane	ND	ND	ND	6.7	5.3	4.3
Bromoform	ND	ND	ND	5.0	5.8	4.7

	Caustic (NaOH)			Stack Condensate		
	Run 1	Run 3	Run 4	Run 1	Run 3	Run 4

None Detected

Volatile Organics Detected in Process Streams, mg/L

	Heated Discharge Conveyor Ash			Cyclone Residue		
	Run 1	Run 3	Run 4	Run 1	Run 3	Run 4
Methylene Chloride	ND	ND	ND	0.040	0.350	0.110
Xylenes(total)	ND	ND	ND	ND	0.103	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	0.029	ND

Semi-Volatile Organics Detected in Process Streams, mg/L

Process	Units	Test Runs No. 1	No. 3	No.4
HDC Ash,	mg/L	ND	ND	ND
Cyclone Ash,	mg/L	ND	ND	ND
Scrubber Brine,	ug/L	ND	ND	ND
Process Water,	ug/L	ND	ND	ND
Caustic,	ug/L	ND	ND	ND
Stack Condensate,	ug/l	ND	ND	ND

Metals in Process Streams, mg/L

	Scrubber Brine			Process Water		
	Run 1	Run 3	Run 4	Run 1	Run 3	Run 4
Aluminum	<238.0	<265.0	<399.0	<0.10	<0.10	<0.10
Antimony	25.2	18.3	18.4	<0.06	<0.06	<0.06
Arsenic	5.7	12.2	15.5	<0.10	<0.10	<0.10
Barium	1.80	3.70	6.30	<0.01	<0.01	<0.01
Beryllium	<0.02	<0.02	<0.02	<0.002	<0.002	<0.002
Boron	11.9	20.2	24.5	<0.10	<0.10	<0.10
Cadminum	5.5	10.6	13.4	<0.005	<0.005	<0.005
Chromium	3.8	4.0	6.0	<0.01	<0.01	<0.01
Cobalt	0.23	0.33	0.41	<0.01	<0.10	<0.01
Copper	3.2	4.1	5.5	<0.02	<0.02	<0.02
Lead	492.0	1020.0	1290	<0.05	<0.05	<0.05
Manganese	0.90	0.97	1.50	<0.10	<0.01	0.01
Mercury	<0.002	<0.002	<0.002	<0.0002	<0.0002	<0.0002
Nickel	2.7	2.4	4.1	<0.04	<0.04	<0.04
Selenium	<2.0	<2.0	<2.0	<0.2	<0.2	<0.20
Silver	<0.10	<0.10	<0.01	<0.01	<0.01	<0.01
Thallium	<20.0	<20.0	<20.0	<2.0	<2.0	<2.0
Tin	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10
Vanadium	0.34	0.38	0.40	<0.01	<0.01	<0.10
Zinc	120.0	287.0	358	0.12	2.3	2.9

	Caustic (NaOH)			Stack Condensate		
	Run 1	Run 3	Run 4	Run 1	Run 3	Run 4
Aluminum	9.0	9.5	9.7	<0.10	<0.10	<0.10
Antimony	<0.60	<0.60	<0.60	<0.06	<0.06	<0.06
Arsenic	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10
Barium	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Beryllium	<0.02	<0.02	<0.02	<0.002	<0.002	<0.002
Boron	3.2	3.4	3.5	<0.10	<0.10	<0.10
Cadminum	0.05	<0.05	<0.05	<0.005	0.0052	<0.0053
Chromium	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Cobalt	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Copper	<0.20	1.2	<0.20	<0.02	<0.02	<0.02
Lead	<0.05	<0.50	0.71	<0.05	<0.05	<0.05
Manganese	<0.10	<0.10	<0.10	0.46	0.77	0.76
Mercury	<0.002	<0.002	<0.002	<0.0002	<0.0002	<0.0002
Nickel	<0.40	<0.40	<0.40	<0.04	<0.04	<0.04
Selenium	<2.0	<2.0	<2.0	<0.20	<0.20	<0.20
Silver	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Thallium	<20.0	<20.0	<20.0	<2.0	<2.0	<2.0
Tin	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10
Vanadium	0.26	0.30	0.30	<0.01	<0.01	<0.01
Zinc	1.1	1.2	1.3	2.1	4.1	4.9

Metals in Process Streams, mg/Kg

	Heated Discharge Conveyor Ash			Cyclone Residue		
	Run 1	Run 3	Run 4	Run 1	Run 3	Run 4
Aluminum	80,900	66,100	83,000	114,000	105,000	128,000
Antimony	<12.0	6.5	6.0	22.3	78.4	137
Arsenic	<20.0	<10.0	11.7	168	230	180
Barium	30.8	354	622	851	712	1,310
Beryllium	<0.40	<0.20	<0.20	<0.40	<0.40	<0.40
Boron	462	4,260	2,700	1,930	2,070	2,470
Cadminum	211	94.2	106	153	240	207
Chromium	148	69.5	102	384	497	526
Cobalt	14.5	86.9	25.4	28.8	34.5	40.0
Copper	891	611	1,700	2,050	1,820	2,210
Lead	245	119	233	11,700	16,700	13,300
Manganese	159	65.1	156	276	347	320
Mercury	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	46.6	35.0	111	521	548	1,090
Selenium	<40.0	<20.0	<0.20	<40.0	<40.0	<0.40
Silver	<2.0	<1.0	<1.0	<2.0	2.5	<2.6
Thallium	<400	<200	<200	<400	<400	<400
Tin	<20.0	12.0	24.3	<20.0	<20.0	<20.0
Vanadium	11.7	2.4	14.5	29.0	35.9	31.4
Zinc	17,900	964	4,830	4,790	4,880	5,630

Metals TCLP in Process Streams, mg/Kg

	Heated Discharge Conveyor Ash			Cyclone Residue		
	Run 1	Run 3	Run 4	Run 1	Run 3	Run 4
Arsenic	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Barium	0.89	9.3	4.1	0.17	0.22	0.40
Cadminum	0.66	4.1	1.8	<0.05	0.35	<0.05
Chromium	<0.10	<0.10	<0.10	<0.19	2.90	0.74
Lead	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Mercury	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

9. TOCDF DFS R&D RESULTS: The TSCA R&D Tests were completed during November and December 1995. Results of the test and required conditions are summarized.

Test Parameters	Test Results	Requirements
- Feed Rate:	29.5 rockets/hr.	
- PCB Feed Rate:	3.82 gm/min.	
- PCB DRE:	99.99998%	99.9999%
- The Kiln Retort Temp:	1100.2°F.	> 1000°F
- The Afterburner Temp:	2149.8°F.	2000°F ± 150°F
- The Retort Revolution:	1.96 rpm	
- Combustion Efficiency:	99.99%	99.9%
- Particulate Matter:	8.4 mg/m^3	180
Stack monitoring results were:		
- oxygen (O_2):	9.7%	
- carbon monoxide (CO):	9.5%	
- carbon dioxide (CO_2):	6.9%	
- nitrogen oxides (NO_x):	218 ppm	
- hydrochloric acid (HCl):	1.81E-5 lb/hr	
- total chlorinated organic (RCl):	39.3 µg/dscm	
- PCBs:	-	from not detected to 0.046 ppm in residues
	-	from not detected to 2.9 ng/dscm in stack emissions
- PCDDs and PCDFs:	-	3.3 TEQ ng/g in cyclone residue
	-	< 0.003 mg/g TEQ in conveyor discharge residues
	-	0.003 ng/dscm TEQ in stack gas

10. Additional results of the November-December 1995 R&D Test are tabulated in Tables A through Table C.

11. The design of the Chemical Agent Disposal Facility in the Deseret Chemical Depot closely follows the design for the Johnston Atoll Chemical Agent Disposal System (JACADS) in Johnston Island, Pacific Ocean. EPA has determined the JACADS DFS to be designed to protect workers and the public from PCB exposure and precludes any apparent release of PCBs to the environment. R&D test data submitted for the TOCDF confirms this determination. Therefore, EPA found that a TSCA PCB Disposal Demonstration Test Burn performed at the TOCDF DFS is equivalent to operations of a 40 CFR Part 761.70 incinerator and does not pose an unreasonable risk of injury to human health or the environment.

TABLE A. SUMMARY OF TOCDF DFS R&D TEST RESULTS

Date Run No.	30-Nov-95 P-1	30-Nov-95 P-2	1-Dec-95 P-3
Kiln Temp Average, F°	1100.4	1099.5	1100.6
AFB Temp Average, F°	2150	2149.7	2149.6
DRE, % by 1247 ppm ave	99.999980	99.999978	99.999980
DRE, % by run ave	99.999979	99.999980	99.999985
Combustion efficiency %	99.986	99.986	99.986
Particulate concentration, gr/dscf @ 7% O_2	0.0047	0.0053	0.0037
HCl Emissions lb/hr	<1.80E-6	<1.79E-6	<1.83E-6
Volatile Chlorinated Organic Compound µg/dscm	58.0	15.6	44.2
Semi-volatile organic compounds, µg/dscm	ND	ND	ND
PCB Concentrations			
Stack Gas, ng/dscm	<2.5	2.6	2.9
Cyclone ash, ppm[a]			0.046
HDC Ash, ppm[a]			<0.0005
Brine, ppb	<0.005	<0.005	<0.005
PCDD/PCDF Exhaust Gas Emission, ng/dscm:			
2,3,7,8-TCDD	<0.001	<0.001	<0.001
Total TCDD	0.023	0.015	0.016
Total PCDD	0.075	0.052	0.063
2,3,7,8-TCDF	0.006	0.004	0.005
Total TCDF	0.13	0.12	0.11
Total PCDF	0.946	0.856	0.688
Total TEQ	0.004	0.003	0.003
PCDD/PCDF Cyclone Catch[a]. ng/g:			
2,3,78-TCDD			0.12
Total TCDD			6.4
Total PCDD			48.1
2,3,7,8-TCDF			0.78
Total TCDF			34
Total PCDF			117.6
Total TEQ			3.3

[a] Only one sample was collected

TABLE A. SUMMARY OF TEST RESULTS, (cont'd)

Date Run No.	30-Nov-95 P-1	30-Nov-95 P-2	1-Dec-95 P-3
PCDD/PCDF HDC Residue, ng/g:			
2,3,7,8-TCDD			<0.001
Total TCDD			<0.001
Total PCDD			<0.002
2,3,7,8-TCDF			<0.002
Total TCDF			<0.002
Total PCDF			<0.003
Total TEQ			<0.003
Exhaust Gas Metal Concentrations, ug/dscm			
Antimony	<7	<7	<7
Arsenic	<34	<34	<34
Barium	5.0	8.4	8.6
Beryllium	<0.6	<0.6	<0.6
Cadmium	16	15	3.0
Chromium	3.	1.9	1.7
Lead	280	349	363
Manganese	5.0	1.1	<1.5
Nickel	2.7	<0.5	<0.5
Selenium	<34	<34	<34
Silver	<1	<1	<1
Thallium	<34	<34	<34
Mercury	<1	<1	<1
Metal Emission Rates			
Total Sample Time, min	120	120	120
Total Sample Volume, dscm	2.212	2.263	2.203
Stack Gas Flow Rate, dscm/min	305.43	310.16	304.78
Metal emission rates, g/sec:			
Antimony	<4.0E-05	<4.0E-05	<4.0E-05
Arsenic	<1.7E-04	<1.7E-04	<1.7E-04
Barium	2.55E-05	4.34E-05	4.37E-05
Beryllium	<3.1E-06	<3.1E-06	<3.1E-06
Cadmium	8.14E-05	7.75E-05	1.52E-05
Chromium	1.63E-05	9.82E-06	8.64E-06
Lead	1.43E-03	1.80E-03	1.84E-03
Manganese	2.55E-05	5.69E-06	<5.7E-06
Nickel	1.37E-05	<2.6E-06	<2.6E-06
Selenium	<1.7E-04	<1.7E-04	<1.7E-04
Silver	<5.1E-06	<5.1E-06	<5.1E-06
Thallium	<1.7E-04	<1.7E-04	<1.7E-04
Mercury	<5.1E-06	<5.1E-06	<5.1E-06

TABLE B. TSCA PROCESS CONDITIONS SUMMARY

Date Run No.	30-Nov-95 P-1	30-Nov-95 P-2	1-Dec-95 P-3
Test Start	856	1530	1120
Test End	1130	1950	1400
PCB Emissions:			
Waste Feed Rate, rockets/hr	28.5	27	33
PCB concentration, ppm	1247	1247	1247
Total Sample time, min	120	120	120
Total Sample Volume, dscm	2.063	2.000	1.996
PCB Feed Rate, g/min	3.685	3.496	4.268
PCB Emission Rate, g/min	7.37E-07	7.64E-07	8.65E-07
PCB DRE,%	99.999980	99.999978	99.999980
Operating Parameters:			
Auxiliary Fuel Rate,[a] scfm	569	554	563
Combustion Air Flow,[a] scfm	6826	6647	6755
Average Residence Time[a], sec	2.36	2.40	2.36
Oxygen, Vol.%[b]	9.9	9.6	9.7
Carbon Dioxide, Vol.%[b]	6.8	6.8	7.0
Avrage Carbon Monoxide, ppm[c]	9.40	9.25	9.89
Combustion Efficiency, %	99.986	99.986	99.986
Ave.Nitrogen Oxides (NOx), ppm	142	260	252
Average Quench Brine pH[a]	8.96	8.98	8.98
Ave. Venturi Brine Flow,[a] gpm	365.12	365.27	365.08
Ave. Venturi Pressure,[a] in wc	30.00	30.01	30.08
Particulate/HCl Emissions:			
Total Sample Time, min	120	120	120
Total Sample Volume, dscm	2.201	2.217	2.159
Stack Gas Flow Rate, dscm/min	298.97	299.56	299.76
Part. Concentration, mg/dscm@7%O2	8.5	9.7	6.9
Part. Emission Rates, lb/hr	0.333	0.385	0.273
HCl Emissions, g/min	<1.36E-5	<1.35E-5	<1.38E-5
HCl Emission Rates, lb/hr	<1.80E-5	<1.79E-5	<1.83E-5

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[a] Average from PDARS Data
[b] Orsat analysis dry basis
[c] Average from PDARS @ 7% O_2

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS

STACK GAS EMISSIONS

Date	30-Nov-95	30-Nov-95	1-Dec-95
Run No.	P-1	P-2	P-3
VOST Results, Average of Six Samples			
Chlorinated Compounds, Results Reported in Nanograms (ng)			
Chloromethane	386.5	<7.2	27.7
Vinyl chloride	<5.2	<5.2	<5.2
Chloroethane	<6.5	<6.5	<6.5
Methylene chloride	436.7	197.8	425
1,1-Dichloroethane	<2.4	<2.4	<2.4
1,1-Dichloroethene	<2.7	<2.7	<2.7
1,2-Dichloroethene	<2.7	<2.7	<2.7
Chloroform	20.5	19.2	73.2
1,2-Dichloroethane	2.3	<2.3	<2.3
1,1,1-Trichloroethane	11.2	<4.0	31.2
Carbon tetrachloride	<9.9	<9.9	<9.9
Bromodichloromethane	19.4	26.2	<72.5
1,2-Dichloropropane	<0.65	<0.65	<0.65
cis-1,3-Dichloropropene	<2.1	<2.1	<2.1
Trichloroethene	<2.7	<2.7	5.0
Dibromochloromethane	20.2	27.5	75
1,1,2-Trichloroethane	<1.6	<1.6	<1.6
trans-1,3-Dichloropropene	<2.2	<2.2	<2.2
1,1,2,2-Tetrachloroethane	<1.6	<1.6	<1.6
Pentachloroethane	<1.7	<1.7	<1.7
Chlorobenzene	<1.5	<1.5	<1.5
Non-Chlorinated Compounds, Results Reported in Nanograms (ng)			
Bromomethane	151.7	<45	60.5
Acetone	481.7	371.2	519.2
Carbon disulfide	51.1	18.3	58.2
2-Butanone	17.2	<17	52.0
Benzene	27.6	19.7	56.0
Bromoform	26.1	27.7	46.33
4-Methyl-2-pentanone	<1.7	<1.7	<1.7
2-Hexanone	<3.8	<3.8	<3.8
Toluene	29.0	34.2	38.7
Ethylbenzene	<1.9	<1.9	<1.9
Styrene	2.5	2.3	7.0
m-&p-Xylene	<1.4	<1.4	<1.4
o-Xylene	<1.6	<1.6	<1.6
Surrogates, Results Reported in Nanograms (ng)			
1,2-Dichloroethane-D4	330.0	213.3	266.7
Toluene-D8	231.7	245	200
Bromofluorobenzene	268.3	241.7	277
Tentatively Identified Compounds, Results Reported in Nanograms (ng)			
Propane	-	270	410
Trichlorofluoromethane	63.3	55	55.3
Cyclohexane	1270	103.3	118.5
Dimethyl ether	-	60	-
Benzaldehyde	42.3	30	41.7
Pentane	130	49.5	97.3

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS (cont'd)

STACK GAS EMISSIONS

Date	30-Nov-95	30-Nov-95	1-Dec-95
Run No.	P-1	P-2	P-3
Semi-Volatile Organics Results, µg/dscm			
Method 8270			
1,2,4-Trichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND
2-Chlorophenol	ND	ND	ND
4-Chloro-3-methylphenol	ND	ND	ND
4-Nitrophenol	ND	ND	ND
Acenaphthene	ND	ND	ND
N-Nitrosodipropylamine	ND	ND	ND
Pentachlorophenol	ND	ND	ND
Phenol	ND	ND	ND
Pyrene	ND	ND	ND
Tentatively identified compounds			
Benzoic acid	14	11	14
PCBs, ng/dcsm^3			
Method 680			
Monochlorobiphenyl	<2.5	<2.5	<2.5
Dichlorobiphenyl	<2.5	<2.5	<2.5
Trichlorobiphenyl	<2.5	2.6	2.9
Tetrachlorobiphenyl	<2.5	<2.5	<2.5
Pentachlorobiphenyl	<2.5	<2.5	<2.5
Hexachlorobiphenyl	<2.5	<2.5	<2.5
Heptachlorobiphenyl	<2.5	<2.5	<2.5
Octachlorobiphenyl	<2.5	<2.5	<2.5
Nonachlorobiphenyl	<2.5	<2.5	<2.5
Decachlorobiphenyl	<2.5	<2.5	<2.5
PCDD/PCDF, ng/dscm^3			
Method 8280			
2,3,7,8-TCDD	<0.001	<0.001	<0.001
Total TCDD	0.023	0.015	0.016
Total PCDD	0.075	0.052	0.053
TEQ PCDD	3.40E-05	2.20E-05	2.80E-05
2,3,7,8-TCDF	0.006	0.004	0.005
Total TCDF	0.125	0.12	0.11
Total PCDF	0.95	0.85	0.69
TEQ PCDF	3.80E-03	3.40E-03	3.40E-03

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS (cont'd)

Date: 1-Dec-95 Sample	Cyclone Ash	HDC Ash
ASH PCB ANALYSIS		
Method 680, ppb		
Monochlorobiphenyl	10	<0.5
Dichlorobiphenyl	25	<0.5
Trichlorobiphenyl	4.2	<0.5
Tetrachlorobiphenyl	0.57	<0.5
Pentachlorobiphenyl	<0.5	<0.5
Hexachlorobiphenyl	<0.5	<0.5
Heptachlorobiphenyl	<0.5	<0.5
Octachlorobiphenyl	<0.5	<0.5
Nonachlorobiphenyl	0.64	<0.5
Decachlorobiphenyl	6	<0.5
ASH DIOXIN ANALYSIS		
Method 8290, ppb		
2,3,7,8-TCDD	0.12	<0.0005
Total TCDD	6.4	<0.0005
Total PCDD	48	ND
TEQ PCDD	1.18	ND
2,3,7,8-TCDF	0.78	<0.0005
Total TCDF	34	<0.0005
Total PCDF	118	ND
TEQ PCDF	3.3	ND
ASH TCLP ANALYSIS		
VOCs, mg/L		
Method SW-8240		
Benzene	<0.005	<0.005
Carbon tetrachloride	<0.005	<0.005
Chlorobenzene	<0.005	<0.005
Chloroform	<0.005	<0.005
1,2-Dichloroethane	<0.005	<0.005
1,1-Dichloroethene	<0.005	<0.005
Methyl ethyl ketone	<0.100	<0.100
Tetrachloroethene	<0.005	<0.005
Trichloroethene	<0.005	<0.005
Vinyl chloride	<0.100	<0.100
Chlorinated Herbicides, mg/L		
Method SW-8150,		
2,4-D	<0.02	<0.02
2,4,5-TP(Silvex)	<0.01	<0.01

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS (cont'd)

ASH TCLP ANALYSIS

Date: 1-Dec-95 Sample	Cyclone Ash	HDC Ash
SVOCs, mg/L Method SW-8270A		
m-&p-Cresol	<0.100	<0.100
o-Cresol	<0.100	<0.100
1,4-Dichlorobenzene	<0.100	<0.100
2,4-Dinitrotoluene	<0.100	<0.100
Hexachlorobenzene	<0.100	<0.100
Hexachloro-1,3-butadiene	<0.100	<0.100
Hexachloroethane	<0.100	<0.100
Nitrobenzene	<0.100	<0.100
Pentachlorophenol	<0.500	<0.500
Pyridine	<0.100	<0.100
2,4,5-Trichlorophenol	<0.100	<0.100
2,4,6-Trichlorophenol	<0.100	<0.100
Organochlorine Pesticides, mg/L Method SW-8080		
Endrin	<0.0005	<0.0005
Lindane	<0.0005	<0.0005
Methoxychlor	<0.005	<0.005
Toxaphene	<0.01	<0.01
Alpha Chlordane	<0.001	<0.001
Gamma Chlordane	<0.001	<0.001
Heptachlor	<0.0005	<0.0005
Heptachlor epoxide	<0.0005	<0.0005
Metals, mg/L Method SW-6010		
Arsenic	<0.5	<0.5
Barium	0.61	2.6
Cadmium	2.8	6.2
Chromium	0.94	0.067
Lead	47	0.49
Selenium	<0.30	<0.30
Silver	<0.02	<0.02
Nickel	2.2	11
Aluminum	25	15,000
Mercury Method 7470	<0.0002	<0.0002

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS (cont'd)

BRINE ANALYSIS

Date	30-Nov-95	30-Nov-95	1-Dec-95
Run No.	P-1	P-2	P-3
PCBs, ng/L			
Method 680			
Monochlorobiphenyl	<5.0	<5.0	<5.0
Dichlorobiphenyl	<5.0	<5.0	<5.0
Trichlorobiphenyl	<5.0	<5.0	<5.0
Tetrachlorobiphenyl	<5.0	<5.0	<5.0
Pentachlorobiphenyl	<5.0	<5.0	<5.0
Hexachlorobiphenyl	<5.0	<5.0	<5.0
Heptachlorobiphenyl	<5.0	<5.0	<5.0
Octachlorobiphenyl	<5.0	<5.0	<5.0
Nonachlorobiphenyl	<5.0	<5.0	<5.0
Decachlorobiphenyl	<5.0	<5.0	<5.0
PCDD/PCDF, ng/L			
Method 8290			
2,3,7,8-TCDD	<0.02	<0.02	<0.02
Total TCDD	<0.02	<0.02	<0.02
Total PCDD	ND	ND	ND
TEQ PCDD	ND	ND	ND
2,3,7,8-TCDF	<0.02	<0.02	<0.02
Total TCDF	<0.02	<0.02	<0.02
Total PCDF	ND	ND	ND
TEQ PCDF	ND	ND	ND
VOCs, mg/L			
Method SW-8240			
Benzene	<0.00013	<0.00013	<0.00013
Carbon tetrachloride	<0.00021	<0.00021	<0.00021
Chlorobenzene	<0.0015	<0.0015	<0.0015
Chloroform	<0.00021	<0.00021	<0.00021
1,2-Dichloroethane	<0.00024	<0.00024	<0.00024
1,1-Dichloroethene	<0.00025	<0.00025	<0.00025
Methyl ethyl ketone	<0.0039	<0.0039	<0.0039
Tetrachloroethene	<0.00023	<0.00023	<0.00023
Trichloroethene	<0.00018	<0.00018	<0.00018
Vinyl chloride	<0.00032	<0.00032	<0.00032
Chlorinated Herbicides, mg/L			
Method SW-8150			
2,4-D	<0.02	<0.02	
<0.02			
2,4,5-TP(Silvex)	<0.01	<0.01	1.33

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS (cont'd)

BRINE ANALYSIS

Date	30-Nov-95	30-Nov-95	1-Dec-95
Run No.	P-1	P-2	P-3
SVOCs, µ/L			
Method SW-8270			
m-&p-Cresol	<6.5	<6.5	<6.5
o-Cresol	<9.5	<9.5	<9.5
1,4-Dichlorobenzene	<6.0	<6.0	<6.0
2,4-Dinitrotoluene	<9.5	<9.5	<9.5
Hexachlorobenzene	<5.5	<5.5	<5.5
Hexachloro-1,3-butadiene	<5.5	<5.5	<5.5
Hexachloroethane	<8.5	<8.5	<8.5
Nitrobenzene	<6.0	<6.0	<6.0
Pentachlorophenol	<8.5	<8.5	<8.5
Pyridine	<7.0	<7.0	<7.0
2,4,5-Trichlorophenol	<13.0	<13.0	<13.0
2,4,6-Trichlorophenol	<14.0	<14.0	<14.0
Organochlorine Pesticides, µg/L			
Method SW-8080			
Endrin	<0.1	<0.1	<0.1
Lindane	<0.05	<0.05	<0.05
Methoxychlor	<0.5	<0.5	<0.5
Toxaphene	<5.0	<5.0	<5.0
Alpha Chlordane	<0.05	<0.05	<0.05
Gamma Chlordane	<0.05	<0.05	<0.05
Heptachlor	<0.05	<0.05	<0.05
Heptachlor epoxide	<0.05	<0.05	<0.05
Total Dissolved Solids, mg/L			
Method 160.1			
TDS	130,000	140,000	140,000
Metals,			
Method SW-6010, mg/L			
Arsenic	<0.3	<0.3	<0.3
Barium	2.8	4.8	4.0
Cadmium	5.0	8.9	8.2
Chromium	6.0	7.0	6.9
Lead	420	740	750
Selenium	<0.3	<0.3	<0.3
Silver	<0.01	<0.01	<0.01
Nickel	6.7	7.7	5.8
Aluminum	220	260	190
Mercury Method 7470	<0.00002	0.0039	0.00014

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS (cont'd)

VOST RESULTS: INDIVIDUAL SAMPLES

TSCA RUN No. 1

Samples collected November 30, 1995, analyzed December 1, 1995

Chlorinated Compounds, Results Reported in Nanograms (ng)

Sample No	TSCA.V01	TSCA.V02	TSCA.V03	TSCA.V04	TSCA.V05	TSCA.V06
Chloromethane	<7.2	<7.2	2000	290	<7.2	<7.2
Vinyl chloride	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
Chloroethane	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5
Methylene chloride	50	120	1700	490	140	120
1,1-Dichloroethane	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
1,1-Dichloroethene	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
1,2-Dichloroethene	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
Chloroform	<2.1	20	<2.1	57	23	19
1,2-Dichloroethane	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3
1,1,1-Trichloroethane	<4.0	<4.0	<4.0	17	22	16
Carbon tetrachloride	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9
Bromodichloromethane	<4.1	29	<4.1	17	33	29
1,2-Dichloropropane	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65
cis-1,3-Dichloropropene	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
Trichloroethene	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
Dibromochloromethane	<1.1	32	<1.1	20	35	32
1,1,2-Trichloroethane	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
trans-1,3-Dichloropropene	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
1,1,2,2-Tetrachloroethane	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Pentachloroethane	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Chlorobenzene	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5

Non-Chlorinated Compounds, Results Reported in Nanograms (ng)

Bromomethane	<45	<45	630	100	<45	<45
Acetone	450	250	1400	220	260	310
Carbon disulfide	<3.4	16	160	41	18	17
2-Butanone	<17	18	<17	<17	<17	<17
Benzene	<1.7	21	81	23	20	19
Bromoform	<2.8	33	33	20	33	35
4-Methyl-2-pentanone	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
2-Hexanone	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8
Toluene	25	28	42	27	25	27
Ethylbenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Styrene	<1.6	<1.6	6.7	<1.6	<1.6	<1.6
m-&p-Xylene	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
o-Xylene	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6

Surrogates, Results Reported in Nanograms (ng)

1,2-Dichloroethane-D4	200	220	530	550	250	230
Toluene-D8	240	250	180	240	240	240
Bromofluorobenzene	250	240	350	260	260	250

Tentatively Identified Compounds, Results Reported in Nanograms (ng)

Propane						
Trichlorofluoromethane	200		98	46	36	
Cyclohexane	140		2400			
Dimethyl ether						
Benzaldehyde			62	31	34	
Pentane			130			

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS (cont'd)

VOST RESULTS: INDIVIDUAL SAMPLES

TSCA RUN No. 2

Samples collected November 30, 1995, analyzed December 1, 1995

Chlorinated Compounds, Results Reported in Nanograms (ng)

Sample No	TSCA.V01	TSCA.V02	TSCA.V03	TSCA.V04	TSCA.V05	TSCA.V06
Chloromethane	<7.2	<7.2	<7.2	<7.2	<7.2	<7.2
Vinyl chloride	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
Chloroethane	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5
Methylene chloride	430	290	160	98	130	79
1,1-Dichloroethane	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
1,1-Dichloroethene	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
1,2-Dichloroethene	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
Chloroform	19	16	20	23	20	17
1,2-Dichloroethane	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3
1,1,1-Trichloroethane	<4.0	<4.0	<4.0	<4.0	5.1	<4.0
Carbon tetrachloride	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9
Bromodichloromethane	26	26	26	30	26	23
1,2-Dichloropropane	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65
cis-1,3-Dichloropropene	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
Trichloroethene	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
Dibromochloromethane	28	29	26	31	26	25
1,1,2-Trichloroethane	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
trans-1,3-Dichloropropene	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
1,1,2,2-Tetrachloroethane	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Pentachloroethane	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Chlorobenzene	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5

Non-Chlorinated Compounds, Results Reported in Nanograms (ng)

Bromomethane	<45	<45	<45	<45	<45	<45
Acetone	590	550	320	230	280	260
Carbon disulfide	17	15	19	20	20	19
2-Butanone	<17	<17	<17	<17	<17	<17
Benzene	16	16	22	22	22	20
Bromoform	27	44	16	26	20	33
4-Methyl-2-pentanone	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
2-Hexanone	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8
Toluene	53	34	34	29	28	27
Ethylbenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Styrene	<1.6	<1.6	<1.6	<1.6	5.8	<1.6
m-&p-Xylene	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
o-Xylene	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6

Surrogates, Results Reported in Nanograms (ng)

1,2-Dichloroethane-D4	200	190	220	230	230	210
Toluene-D8	240	260	240	240	240	250
Bromofluorobenzene	260	230	240	240	240	240

Tentatively Identified Compounds, Results Reported in Nanograms (ng)

Propane	270					
Trichlorofluoromethane	66	44				
Cyclohexane	110	110	110	110	130	50
Dimethyl ether		48		66	66	
Benzaldehyde					30	
Pentane		58	47	39	54	

TABLE C. TOCDF DFS R&D ANALYTICAL RESULTS (cont'd)

VOST RESULTS: INDIVIDUAL SAMPLES

TSCA RUN No. 3

Samples collected December 1, 1995, analyzed December 4, 1995.

Chlorinated Compounds, Results Reported in Nanograms (ng)

Sample No	TSCA.V01	TSCA.V02	TSCA.V03	TSCA.V04	TSCA.V05	TSCA.V06
Chloromethane	<7.2	130	<7.2	<7.2	<7.2	<7.2
Vinyl chloride	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
Chloroethane	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5
Methylene chloride	560	170	270	900	120	530
1,1-Dichloroethane	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
1,1-Dichloroethene	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
1,2-Dichloroethene	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
Chloroform	26	30	52	110	41	180
1,2-Dichloroethane	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3
1,1,1-Trichloroethane	7.3	ND	18	23	29	110
Carbon tetrachloride	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9
Bromodichloromethane	31	30	54	93	47	180
1,2-Dichloropropane	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65
cis-1,3-Dichloropropene	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
Trichloroethene	<2.7	8.0	11	<2.7	<2.7	<2.7
Dibromochloromethane	31	31	60	100	49	180
1,1,2-Trichloroethane	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
trans-1,3-Dichloropropene	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
1,1,2,2-Tetrachloroethane	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Pentachloroethane	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Chlorobenzene	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5

Non-Chlorinated Compounds, Results Reported in Nanograms (ng)

Bromomethane	73	110	<45	<45	<45	<45
Acetone	190	85	400	640	300	1500
Carbon disulfide	20	20	37	79	33	160
2-Butanone	<17	<17	35	78	25	140
Benzene	26	20	40	87	33	130
Bromoform	12	21	36	58	41	110
4-Methyl-2-pentanone	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
2-Hexanone	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8
Toluene	28	18	31	54	27	74
Ethylbenzene	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Styrene	<1.6	<1.6	<1.6	<1.6	5.8	<1.6
m-&p-Xylene	<1.4	<1.4	<1.4	12	7.0	18
o-Xylene	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6

Surrogates, Results Reported in Nanograms (ng)

1,2-Dichloroethane-D4	230	260	260	310	240	300
Toluene-D8	230	230	200	180	200	160
Bromofluorobenzene	250	250	280	290	270	320

Tentatively Identified Compounds, Results Reported in Nanograms (ng)

Propane	410					
Trichlorofluoromethane	52		30	100		150
Cyclohexane	75	76	140	420		
Dimethyl ether						
Benzaldehyde			29	61	35	
Pentane	41	46	72	230		

DEPARTMENT OF THE ARMY
PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION
ABERDEEN PROVING GROUND, MARYLAND 21010-5401

AUG 21 1998

REPLY TO
ATTENTION OF

Tooele Chemical Agent
Disposal Facility

PM-81243

SUBJECT: Request to Allow Interim Operation of the Deactivation Furnace System (DFS) using M55 Rockets and Associated PCB Articles (M441 Shipping/Firing Tubes) as Feedstock

Mr. John W. Melone, Director
National Program Chemicals Division
U.S. Environmental Protection Agency
Office of Prevention, Pesticides and Toxic Substances
401 M. Street SW
Washington, D.C. 20460

Dear Mr. Melone:

The purpose of this letter is as follows:

- Notify the Office of Prevention, Pesticides and Toxic Substances of the intent of the Tooele Chemical Agent Disposal Facility (TOCDF) to resume disposal of Polychlorinated Biphenyl (PCB) articles (i.e., M441 Shipping/Firing Tubes) using the Deactivation Furnace System (DFS) beginning no earlier than September 24, 1998, and to

- Request approval from the Office of Prevention, Pesticides and Toxic Substances for additional hours of DFS operation, using chemical agent GB M55 Rockets and their associated M441 Shipping/Firing Tubes as feedstock, for conducting: 1) system preparation and readiness demonstrations (Shakedown), 2) one Resource Conservation and Recovery Act (RCRA) trial burn consisting of three successful runs, and, 3) continued interim operations of the DFS at half of permitted feed rates following completion of three successful trial burn runs (Post-Trial Burn Operations).

Utah Division of Solid and Hazardous Waste (DSHW) correspondence dated July 14, 1998, requires the TOCDF to repeat the RCRA DFS GB Agent Trial Burn (ATB) in its entirety (See Enclosure 1). TOCDF does not expect to receive the final "Approval to Dispose of PCBs" from the Office of Prevention, Pesticides and Toxic Substances before the time it becomes necessary to resume DFS operations in support of the upcoming ATB repeat.

Since the RCRA DFS GB ATB will use as feedstock GB M55 Rockets and associated M441 Shipping/Firing tubes which are regulated as PCB articles, the EPA Office of Prevention, Pesticides and Toxic Substances is requested to grant approval for the TOCDF to:

- Operate the DFS, beginning no earlier than September 24, 1998, for a period not to exceed 500 hours of waste feed or 13,000 GB M55 Rockets with associated M441 Shipping/Firing Tubes processed, whichever occurs first, to prepare the DFS and support systems and to demonstrate system readiness prior to the RCRA DFS GB ATB repeat.

- Perform individual RCRA Trial Burn runs until three successful runs have been completed. Lists of the process and exhaust gas samples from the RCRA DFS GB ATB Plan dated August 13, 1998, including the sampling frequency, sampling method, and parameters of analysis applicable to each sample type can be found in Enclosure 2. Please note the type of samples and parameters of analysis conform with the requirements of Conditions 6 and 7 of the EPA Approval to Perform the TSCA Demonstration Burn for PCB Disposal which was awarded to the TOCDF on September 10, 1996, except for the following:

  Cyclone residues will not be analyzed for the energetic compounds dinitrotoluene (DNT) and cyclotetramethylenetetranitramine (HMX) since they are not constituents found in the feed (See Condition 6.B.)

  A Destruction and Removal Efficiency (DRE) for PCBs will not be determined since there is not an adequate quantity of M441 Shipping/Firing Tubes with a high enough concentration of PCBs to verify a PCB DRE (See Conditions 3, 4, 7, & 8.)

  During the RCRA DFS GB ATB, to be conducted per the requirements of the Utah DSHW, TOCDF will also comply with the requirements of Conditions 1, 2, 5, 9 through 13, and 15 through 22 of the EPA Approval to Perform the TSCA Demonstration Burn for PCB Disposal dated September 10, 1996.

- Continue to feed GB M55 Rockets with associated M441 Shipping/Firing Tubes at a feed rate not to exceed half of the permitted feed rate after the ATB has been completed until the RCRA DFS GB ATB Report is approved by the Utah DSHW, or until the remaining Deseret Chemical Depot (DCD) GB M55 Rocket Stockpile is destroyed. There are 17,353 GB M55 Rockets in the DCD stockpile. After completion of the RCRA DFS GB ATB and associated shakedown period, it is anticipated that there will be between 3,000 and 5,000 rockets remaining. Note, the TOCDF RCRA Part B permit issued by the Utah DSHW allows for post-trial burn DFS operations at half feed rates (i.e., 19 rockets per hour).

Your technical point of contact in this matter is Mr. Mike Saupe at (435) 833-7475.

Sincerely,

James F. Colburn
EG&G Defense Materials

Thaddeus A. Ryba Jr.
TOCDF Site Assistant
Project Manager

Enclosures

Copies Furnished:

Dan Bench, EPA Region VIII
Dennis R. Downs, Utah DSHW
Harold Oliver
Pete Davis
Rick Holmes
Joe Stang
Dave Jackson
Mike Saupe
Jay Shah
Jack Maddox
Dick Snell
File

Enclosure 1

State of Utah
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF SOLID AND HAZARDOUS WASTE

Michael O. Leavitt
Governor
Dianne R. Nielson, Ph.D.
Executive Director
Dennis R. Downs
Director

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July 14, 1998

Colonel Joseph E. Huber, Commanding
Deseret Chemical Depot
Tooele, UT 84074-5031

and

Mr. Timothy Thomas, Project Manager
PMCD TOCDF
11620 Stark Road
Tooele, UT 84074-5000

Dear Col. Huber and Mr. Thomas:

RE: Deactivation Furnace (DFS) GB Agent Trial Burn Report
SHW Tracking Numbers 98.00265
Deseret Chemical Depot - TOCDF, EPA ID No. UT5210090002

After further review of the Deactivation Furnace (DFS) GB Agent Trial Burn Report dated January 14, 1998, the M55 rocket trial burn tests conducted in January 1997 are found to be invalid. The cause for this determination was the apparent malfunction of the Line A rocket agent quantification system (AQS) during those tests. As a result, the destruction and removal efficiency (DRE) of the GB agent cannot be accurately calculated to determine the degree that this performance standard was demonstrated during the trial burn. In addition, field sampling problems, such as those caused by the cold weather during the test period, affected the quality of the data needed for the Health Risk Assessment. Therefore, the DFS GB trial burn must be re-run in its entirety.

A revised DFS GB Agent Trial Burn Plan must be submitted and approved before the test can be conducted. The reasons for this revision are as follows:

1. Due to the low concentrations of both the HCl and particulate matter in the gas emissions, these sampling methods should be re-evaluated. Different EPA sampling techniques may be more appropriate for this furnace system then those used in the 1997 DFS trial burn.

2. The latest (promulgated) EPA sampling methods such as metals, hexavalent chromium and dioxin/furan shall be incorporated into the plan.

3. The GB M55 Rocket test feed rate of 38 rockets per hour does not demonstrate the component feed rates for the M105 and M155 Projectiles as shown in Permit Conditions V.C.3.a and VI.C.3.a.ii. As a result, those two projectiles cannot be fed to the DFS at the existing permitted feed rates unless spiking during the trial burn is considered.

4. Based upon the initial trial burn, the number of process samples and the waste feed characterization needs to be reviewed.

The AQS must be repaired or modified and both drain lines must be shown that they are in calibration before hazardous waste rockets are treated in this furnace. In addition, changes to the rocket feed chutes and bore scopes should be considered before the re-test. Once the plans are developed to resolve these issues, another shakedown period in accordance with Permit Condition VI.C.1.b. must be requested. A sufficient number of rockets must be saved to conduct at least three acceptable trial burn runs, so a request for less than 720 hours of shakedown time is expected.

Once developed, a schedule of these activities should be provided to the DSHW so compliance staffing can be arranged. If you have any question about the items this letter, please contact Raymond Duda at 801-538-6838.

Sincerely,

Dennis R. Downs, Executive Secretary
Utah Solid and Hazardous Waste Control Board

DRD/RMD/ser

c: Mike Saupe, TOCDF
Carl Daly, EPA Region VIII
Hiroshi Dodohara, EPA TSCA
Myron Bateman, E.H.S., M.P.A., Health Officer, Tooele County Health Department

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Enclosure 2

TABLE A-6-1. EXHAUST GAS SAMPLING SUMMARY

SAMPLING TRAIN	ANALYSES PERFORMED	SAMPLING METHOD REFERENCE	TOTAL NUMBER OF SAMPLES COLLECTED DURING THE DFS GB TRIAL BURN (3 RUNS)
DAAMS	Agent	TE-LOP-522	21 sample sets
Method 0030	Volatile Organic Compounds	SW-846, Method 0030	18 trap pairs plus 3 field blank pairs and 1 trip blank pair
Method 0040	VTOC	SW-846, Method 0040	3 sample sets plus one field blank
M1	Traverse Points	40 CFR 60, Appendix A	1
M2	Duct Velocity	40 CFR 60, Appendix A	With each isokinetic train
M4	Exhaust Gas Moisture	40 CFR 60, Appendix A	With each isokinetic train
Method 0050	HF, HCl, Cl_2, and PM	SW-846, Method 0050	3 sample sets plus one field blank
Method 0060	HRA Metals and Total Phosphorus	SW-846, Method 0060	3 sample sets plus one field blank
Method 0023A	PCDD/PCDF	SW-846, Method 0023A	3 sample sets plus one field blank
Mod-Method 0023A	Total PCBs and Co-planar PCBs	SW-846, Method 0023A	3 sample sets plus one field blank
Method 0010	SVOCs	SW-846, Method 0010	3 sample sets plus one field blank
Method 0010	SVTOC and NVTOC	SW-846, Method 0010	3 sample sets plus one field blank
STEM	Nitroglycerin and Trinitrotoluene	STEM	3 sample sets plus one field blank
CEMS	NOx	40 CFR 60, Appendix A, Method 7E	Continuously
CEMS	O_2, CO_2, and CO	CEMS Monitoring Plan	Continuously

TABLE A-6-2. PROCESS SAMPLES COLLECTED

SAMPLE STREAM	ANALYSIS PERFORMED	SAMPLE ID*	SAMPLING METHOD	SAMPLING FREQUENCY	SAMPLE VOLUME
Wet Scrubber Recirculation Brine**	Agent, pH, HRA Metals, VOCs, SVOCs, PCBs, PCDDs/PCDFs	SR	Tap(S004)	One sample per Run	Two 40-mL VOA vials, three 100-mL and one 500-mL bottle
Process Water	HRA Metals, VOCs, SVOCs	PW	Tap(S004)	One sample per ATB	Two 40-mL VOA vials, one 500-mL and two 1-liter bottles
NaOH Makeup	HRA Metals, VOCs, SVOCs	CA	Tap(S004)	One sample per ATB	Two 40-mL VOA vials, one 500-mL and two 1-liter bottles
Agent	Purity, HRA Metals, Organic Impurities, Density	GB	Tap (S004)	One sample per Run	Three vials containing 1 mL of neat agent
Ash Residues**	Agent, HRA Metals, PCBs, PCDDs/PCDFs, nitroglycerin, trinitrotoluene, TCLP: SVOCs, VOCs, Metals	HDC and CB	Grab (S007)	One Sample per Run	One 500-mL and one 1-liter bottle

* Sampling and laboratory internal sample codes
** One run will have a duplicate set of samples collected.